Elliot Maceda

Currently Based in: Raleigh, NC
Contact me via email: elliot.maceda@gmail.com
Links: Website, GitHub, LinkedIn, ORCID, UQ4Life

Education

PhD, Statistics, North Carolina State University, expected 2026; minor in Math
MS, Statistics, Miami University, 2022
BS, Mathematics, University of Houston, 2020; minor in Computer Science

Positions

UQ4Life Researcher, Dept. of Statistics, NC State Univ., Fall 2024 – Ongoing
Teaching Assistant, Dept. of Statistics, NC State Univ., Aug 2022 – Aug 2024
Researcher, Dept. of Statistics, Miami Univ., Aug 2021 – Aug 2022
Teaching Assistant, Dept. of Statistics, Miami Univ., Aug 2020 – May 2022
Grader, Dept. of Mathematics, Univ. of Houston, Jan 2017 – Dec 2019
Researcher, Dept. of Mathematics, Univ. of Houston, June 2018 – Aug 2018

Research Interests

I am a member of UQ4Life, a Research Training Group (RTG) focusing on interdisciplinary research between statistics, mathematics, and life sciences. **My background is in Statistics and Mathematics, but most of my projects are rooted in Biology and Ecology.**

Complex differential equation models are extensively used in life sciences to make predictions on our health or environment under various conditions. **I use Bayesian parameter inference to calibrate these models with data to ensure they are realistic, producing accurate measurements of uncertainty to provide reliable information for scientists and decision makers.**

I also research AI and Machine Learning models, having coded many models to be fast and powerful data-driven predictors. **My research explores how to improve the predictive power of these models by leveraging information from Biological and Ecological models.**

Awards

JSM 2025 ENVR Student Paper Competition Award
Graduate School Diversity Enhancement Grant Award (UNC Campus)
University of Houston Summer Undergraduate Research Fellowship 2018

Peer-Reviewed Papers

Maceda, E., Hector, E. C., Lenzi, A., & Reich, B. J. (2024). A variational neural Bayes framework for inference on intractable posterior distributions. arXiv preprint arXiv:2404.10899. *In submission (Environmetrics)*

Maceda, E., Qu, Z., Reich, B.J. (20??). A novel Approach to Nox Emission Estimates. *In preparation.*

Maceda, E., Miller, J., Reyes-Roza, S., Hernandez, P., Miller, M., Sazdanovic, R., Hill, N. A., Josephs, N., Olufsen, M. S. (20??). Branching Angles in Pulmonary Arterial Networks of Control and Pulmonary Hypertensive Mice. *In preparation.*

Unpublished Projects

1. Using data from O'Keefe et. Al (2015), analyzed baseline microbiome populations in Africans and African Americans using Bayesian Hierarchical modeling with a Gibbs Sampling Algorithm.

2. Conducted a Bayesian Analysis of Extreme Stream Overflows across the United States using an MCMC Metropolis-Hastings sampling algorithm with data collected by the USGS' Hydro-Climatic Data Network.

3. Explored scalable community detection methods in networks—notably the PACE and GALE algorithm as proposed by Mukherjee et. Al (2021)

4. Wrote a blog post on the paper Becker et. Al (1997), which explored the uniqueness of the EM Algorithm's optimization technique and how it could be used in other optimization problems.

5. Worked with Dr. Stephen Write to optimize an EMS system using R code and data from Snyder and Smucker (2022). Devised a decision-making technique to minimize the longest response times of an EMS system of any given county.

6. Collaborated on a project categorizing NASA lunar basalt samples by their trace elements to aid Aleks Gawronska with her PhD dissertation (2023).

7. Consulted Dr. Dee Kinney on a research paper to assess the effectiveness of the Maximize Life Minimize Risk Alcohol Awareness Course offered in Ohio.

8. Contributed code to an Ohio Data Visualization Application currently under development by the students in the Department of Statistics, led by Dr. Bailer

9. Developed a prototype of an interactive, electronic version of the NIOSH Pocket Guide to Chemical Hazards for Dr. Whittaker using R's shiny package.

10. Inspected how widespread the American Opioid Crisis is among states, demographics, and regions using online databases and SAS.

11. Analyzed online breast cancer data by testing it for mathematical properties and by creating a logistic regression model to predict future outcomes of cancerous tumors, given the size and dimensions of a tumor.

Teaching

Intro. to Statistics, NC State University (Fall and Spring 2022-2024, Sum 2024)

NC State Statistics PhD Program Qualifying Exam Bootcamp (Sum 2024)

Intro. to Statistics, Miami University (Fall and Spring 2020-2022)