

Orlando Ferrer

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Technical Skills

Programming: Python, R, SQL
Libraries: PyTorch, Scikit-learn, Pandas, NumPy, Seaborn, Statsmodels, ggplot2, igraph
Machine Learning: MLPs, VAEs, Random Forests, XGBoost, CatBoost, SVMs, GNNs, GCNs, GANs
Concepts: Causal Inference, A/B Testing, Network Science, Anomaly Detection, Survival Analysis

Experience

Machine Learning Intern

May 2025 – July 2025

Pairwise

Durham, NC

- Integrated high-performance Multilayer Perceptron (MLP) and CatBoost models into a deployable Dash interface, providing the team with accessible, real-time predictions to improve CRISPR edit efficiency.
- Synthesized a robust training dataset from years of historical records, using SQL queries to restructure deeply nested hierarchies of molecular component data from past experiments, enabling repeatable model training pipelines.

Graduate Research Assistant

Aug 2023 – May 2025

Duke University

Durham, NC

- Distilled noisy, high-dimensional biological data into interpretable latent signals by implementing Variational Autoencoders (VAEs) and manifold learning techniques to facilitate downstream tasks.
- Modeled gene regulatory networks using spectral and hierarchical clustering algorithms, revealing stable community structures that guided hypothesis generation for ongoing wet-lab validation.

Biostatistics Graduate Intern

May 2022 – Aug 2022

Duke Center for AIDS Research (CFAR)

Durham, NC

- Developed and evaluated supervised learning models (Random Forest, Logistic Regression, KNN) to predict *Talaromyces* infection in individuals with advanced HIV, generating a tool to identify those at highest risk for screening priority.
- Selected from a cohort of ≈ 15 interns to deliver the sole student oral presentation at the 18th Annual CFAR Retreat.

Biostatistics Undergraduate Intern

May 2017 – Aug 2017

UNC-Chapel Hill Center for AIDS Research

Chapel Hill, NC

- Developed *wmwpow*, an R package for exact power calculation, now used by biostatisticians for clinical trial planning.

Education

Ph.D. in Mathematics

Aug 2021 – May 2026 (Expected)

Duke University

Durham, NC

M.A. in Mathematics

Aug 2018 – May 2020

Wake Forest University

Winston-Salem, NC

B.S. in Mathematics

Aug 2015 – May 2017

University of North Carolina at Chapel Hill

Chapel Hill, NC

Publications

- **Ferrer, O.** (2025). *Eccentric Random Walker: A Novel Heuristic for Estimating Longest Simple Paths*. Submitted to CompleNet 2026 (In Review).
- **Ferrer, O.**, Xie, Y., Chan, C., & Xie, J. (2025). *Gene Co-expression Graph Topology Reveals Cellular Pathway Activity*. Submitted to Genome Biology (In Review).
- Mollan, K.R., Trumble, I.M., Reifeis, S.A., **Ferrer, O.**, et al. (2020). *Precise and Accurate Power of the Rank-Sum Test for a Continuous Outcome*. Journal of Biopharmaceutical Statistics.