Cole Foster

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EDUCATION

University of Miami **Miami, FL**
Bachelor of Science | *Triple Major in Computer Science, Mathematics, and Neuroscience* *Expected Graduation May 2026*

- **GPA**: 4.0/4.0
- **Honors:** President's Honor Roll; Provost's Honor Roll; Dean's List; Isaac Bashevis Singer Full Tuition Scholar

TECHNICAL SKILLS

Programming Languages: Python; C; CUDA; C++; R; Java; MATLAB
ML Frameworks: PyTorch; PyTorch Geometric; Scikit-Learn; Hugging Face; XGBoost
Technologies: Git; GitHub; Docker; Kubernetes; CMake
Databases: MySQL; PostgreSQL; SQLite
Specialized Skills: Computer Vision; Transformer Models; Explainable AI; Feature Engineering; Graph Networks; Ensemble Models

RELEVANT COURSEWORK

- **Graduate Level:** Machine Learning; Artificial Intelligence; Statistical Learning
- **CS Core:** Data Structures & Algorithms; Software Engineering; System Programming; Architecture; Theory of Computing
- **Math Core:** Linear Algebra; Abstract Algebra; Numerical Analysis; Probability and Statistics; Calculus (I, II, III, Advanced)

PROFESSIONAL EXPERIENCE

Wuchty Lab, Department of Computer Science, University of Miami **Miami, FL**
Machine Learning Researcher *November 2023 – Present*

- Developed a scalable pipeline for graph embedding and learning tasks, processing **>8M** heterogeneous relationships
- Achieved **98%** lower loss on link prediction and clustering tasks using attention with graph neural networks
- Accelerated code execution by **415x** through vectorization and GPU optimization

DSaCB Lab, Department of Computer Science, University of Miami **Miami, FL**
Machine Learning Researcher *May 2023 – Present*

- Designed a Visual Transformer (ViT) evaluation pipeline processing nearly **500M** attention tokens
- Engineered meta features for transformer evaluation, filtering out **>99%** of non-interpretable features
- Maintained vision model metrics (ACC, AUC, F1) with a **>95%** reduction in training data using ensemble learning

Ali Lab, Miami Project to Cure Paralysis, University of Miami **Miami, FL**
Data Scientist / Computer Vision Researcher *June 2022 – July 2024*

- Invented a feature selection algorithm which removed **nearly all** experimental noise, improving measurable treatment effect by **3 orders of magnitude**
- Constructed a configurable data processing pipeline, decreasing outside experimental variance by **>90%**
- Led automated image processing initiatives that improved data collection speeds by **242x** per sample

PROJECTS

Loan Approval Prediction Model

- Devised a stacked model of gradient boosted trees using Python and Scikit-Learn (XGBoost, CatBoost, LightGBM), resulting in a **>20%** increase in AUC compared to modern singular models
- Generated a further **25%** increase in AUC using feature engineering with domain-specific metrics such as pull-through rate
- Ranked in the top **1%** of competition applicants, garnering recognition

Zero-Shot Drug/Disease Indication Model for Drug Repurposing

- Implemented a graph attention network-based model in PyTorch Geometric to predict additional uses for FDA-approved medications, resulting in successful predictions now in biological testing, saving **~$10M** in target identification costs (NIH)
- Overcame zero-shot classification challenges with a novel embedding method, increasing validation AUC by **>30%**

Few-Shot Ensemble Learning and Interpretability Framework

- Crafted an open-source model ensembling and explainability framework in PyTorch supporting ResNets, DenseNets, and VGGs, with interfaces to import and ensemble other architectures in **under 10mins**
- Implemented a comprehensive visualization layer within the framework, enabling advanced interpretability through class activation maps (CAMs) and feature attribution techniques across multiple deep learning architectures

NFL Pro Bowl Prediction and Player Evaluation

- Investigated the statistics underlying the NFL Pro Bowl selection process in R, comparing multiple classification methods to determine a faithful method for predicting Pro Bowl selections, resulting in **~0.75 F1 Score**
- Explored the importance of each player statistic (Yards, Touchdowns, Turnovers, Etc.) for Pro Bowl selection
- Examined seasons where the model's prediction differed from reality, constructing a statistic to measure how "overrated" or "underrated" a player was in their career

ACTIVITIES & INTERESTS

Activities: Climbing Club; Kappa Theta Pi Technological Fraternity; Flag Football
Interests: Climbing; Hiking; Football; Science Fiction; Robotics; Basketball; Cooking; Baking; Animation; Gaming