Elliot Blackstone, Ph.D.

Ann Arbor, Michigan | US citizen | Email | LinkedIn | GitHub

SUMMARY

Machine learning engineer with a Ph.D. in mathematics, building end-to-end deep learning and tabular ML systems. Experienced in developing and deploying computer vision models in PyTorch (including a custom object detection model served as a web app on Google Cloud Run) and building tabular machine-learning pipelines (tree-based ensembles, linear/logistic regression, stacked/ensemble models, etc.) on large datasets.

SKILLS & CERTIFICATIONS

- <u>Programming & Tools</u>: Python (NumPy, pandas, scikit-learn, matplotlib), SQL, LaTeX, Jupyter, Git, Mathematica, MATLAB
- <u>ML & Computer Vision</u>: PyTorch, torchvision, GPU training (CUDA), CNNs, custom object detection models
- <u>Tabular ML</u>: XGBoost, LightGBM, CatBoost, Random Forest, linear/logistic regression, Optuna, SHAP, cross validation
- <u>Deployment & MLOps</u>: Docker, FastAPI, Google Cloud Platform (Cloud Run)
- <u>Certifications/Awards</u>: Erdős Institute Data Science Boot Camp, UofM Honored Instructor, UCF best dissertation award

SELECTED PROJECTS

Automotive Object Detection [Online Demo] [GitHub]   **Fall 2025**

- Built a from scratch Single Shot Detector (SSD) object-detection model in PyTorch for dashcam imagery (cars, bikes, pedestrians, traffic lights), including a custom preprocessing pipeline, PyTorch Dataset/DataLoader, IoU-based cropping and augmentations, hard negative mining, and mAP@0.50 evaluation to tune architecture and training.
- Trained the model on a 29k-image automotive dataset with 195k annotated bounding boxes, reaching 0.53 mAP@0.50 on the test set after improving data augmentations and adding oversampling (~15% gain over the initial baseline).
- Containerized the model with Docker and served it via a FastAPI app on Google Cloud Run as an image upload web demo.

Predicting Calorie Expenditure - *The Erdős Institute* [LINK] [GitHub]   **Summer 2025**

- Built a supervised learning pipeline to predict workout calorie expenditure from a 750k-row tabular dataset, with log-transform and engineered features, training and tuning linear, GAM, XGBoost, LightGBM, CatBoost, ensemble, and AutoGluon models using Optuna and SHAP, and achieving **4th place out of 4,318 teams** in a Kaggle competition.

Forecasting Inventory Demand - *The Erdős Institute* [LINK] [GitHub]   **Spring 2025**

- Engineered an inventory demand prediction model for the Kaggle Grupo Bimbo competition on a 75 million row dataset, training LightGBM models with client/product aggregate features and adjusted demand from the previous 3 weeks to handle sparse data and cold-start scenarios and improve inventory-demand forecasts.

WORK EXPERIENCE

University of Michigan: Ann Arbor, MI   **2021 - 2025**
Postdoctoral Assistant Professor and James Van Loo Postdoctoral Fellow

- Implemented numerical simulations and data analysis pipelines in Mathematica to study PDE dynamics and visualize emergent patterns. This work led to the publication of four papers and was presented at international conferences.
- Developed course material and taught over 300 students topics such as probability theory, calculus, linear algebra, polynomial regression, and mathematical modeling. Won a teaching award and was named UofM Honored Instructor.

KTH Royal Institute of Technology: Stockholm, Sweden   **2019 - 2021**
Postdoctoral Researcher

- Conducted full-time research in random matrix theory. Performed numerical analysis to verify asymptotic convergence rates, ensuring theoretical models aligned with computational outputs. This work led to the publication of four papers.

University of Central Florida: Orlando, FL   **2012 - 2019**
Research & Teaching Assistant

- Co-authored two papers as part of PhD research that advanced the mathematical foundations of inverse problems and tomographic reconstruction; core techniques in signal processing and computational imaging. Won best dissertation award.
- Developed course material and taught over 600 students between 12 calculus courses, two differential equations courses, and two linear algebra courses. Topics taught include linear regression, singular value decomposition, and multivariable calculus.

EDUCATION

University of Central Florida, *Ph.D. Mathematics*	**2019**
University of Central Florida, *M.S. Mathematics*	**2014**
Penn State Erie, *B.S. Mathematics (Statistics Minor)*	**2011**