

# JACK O'BOYLE

Austin, Texas

📞 1-(810)-588-7647 📩 [jboboyle0@gmail.com](mailto:jboboyle0@gmail.com) 💻 <https://www.linkedin.com/in/jack-o-boyle>

Active Security Clearance

## About

Currently a Machine Learning Engineer working in research and development for cyber-oriented defense contracting, I'm seeking a role where I can leverage mathematics, probability, and machine learning to solve those *keep you up at night* type of problems.

## Education

### University of California, San Diego

*Master of Science in Electrical Engineering (Machine Learning and Data Science)*

*La Jolla, California*

**Sep. 2020 – Mar. 2022**

### Michigan State University

*Bachelor of Science in Electrical and Computer Engineering*

*East Lansing, Michigan*

**Sep. 2016 - May 2020**

## Relevant Coursework

- |                           |                         |                              |                          |
|---------------------------|-------------------------|------------------------------|--------------------------|
| • Mathematical Finance    | • ML for Physical Apps  | • Probability and Statistics | • Computer and Comm.     |
| • Random Processes        | • ML Algorithms         | • Analog Signal Processing   | Security                 |
| • Statistical Learning I  | • Deep Learning & Apps  | • Digital Signal Processing  | • Reinforcement Learning |
| • Statistical Learning II | • Recommender Systems   | • Software Design            | • Modern Physics         |
| • Search & Optimization   | • Linear Algebra & Apps | • Control Systems            | • Calculus I-IV          |

## Technical Skills

**Machine Learning Methods:** Supervised, Semi-supervised and Unsupervised Learning, Reinforcement Learning, Metric Learning, Density Estimation, Transfer Learning

**Machine Learning Models:** Deep Reinforcement Learning, Human Preferences Learning, Graph Neural Networks, Recurrent Neural Networks, Generative Adversarial Networks, Autoencoders and Variational Autoencoders, Gaussian Mixture Models, Neural Cellular Automata, Convolutional Neural Networks, Transformers, Causal Language Models, Large Language Models, Regression, Trees-Boosting/Bagging

**Programming Languages:** Python, SQL, C/C++, HTML, CSS, JavaScript, SQL, Rust, Matlab, Java

**Technologies/Frameworks:** Git, LaTeX, Docker, AWS, Lambda Labs, PyTorch, Tensorflow+Keras, Snowflake

## Experience

### JB Labs LLC

*Owner & Developer*

*Austin, Texas*

**Mar. 2024 – Present**

- Designed and delivered backend solutions to enhance CRM capabilities and improved the management backend for a mid-sized sales organization.

### MaxisIQ

*Senior Machine Learning Engineer IV*

*Austin, Texas*

**Dec. 2023 – Present**

- Held Technical & Team Lead responsibilities for multiple concurrent machine learning research and development efforts.
- Participated in contract negotiations, influencing key technical design decisions, deliverables, and timelines.
- Provided strategic guidance and judgment in machine learning efforts across the research and development division.
- Technical lead for an LLM-based offensive cyber operations assistant application that integrates with Kali Linux environments to improve and automate penetration testing workflows.
- Technical lead for an internal LLM-based cost modeling and automation application for DoD solicitation responses.
- Technical lead for an ML-based Software Defined Radio (SDR) fuzzing contract delivering a package that provided density estimation and generative models to auto-synthesize RF test signals to accelerate vulnerability discovery.

### Machine Learning Engineer III

**Dec. 2022 – Dec. 2023**

- Technical Lead on multiple research projects, managing roles, algorithm and infrastructure design, planning, organization, forecasting, documentation, code review, etc.
- Authored and won two significant technical proposals for AI-based offensive-cyber technologies.
- Led a project that leveraged Deep Reinforcement Learning for Human Preferences (DRLHP) to train a multi-lingual language model that produced sophisticated persuasive content generation for social engineering applications.

- Completed an independent research project leveraging a novel integration of Neural Cellular Automata, Evolutionary Algorithms, and Graph Neural Networks. - [Article](#)

### *Junior Machine Learning Engineer II*

**May 2022 – Dec. 2022**

- Formulated and implemented novel extensions to Graph Neural Network (GNN) based Deep Reinforcement Learning (DRL) algorithms (Rainbow Deep Q Network, Soft Actor-Critic Discrete, Proximal Policy Optimization) to handle a multi-discrete action space. - [Article](#)
- Performed extensive reward function design for DRL including extrinsic reward modules and DRLHP-based reward network training.
- Optimized a DRL environment's IO speed by orders of magnitude via vectorization of computations and parallelizing operations.
- Assigned responsibilities, on-boarded, and mentored machine learning interns.

### **ScriptChain Health**

*Remote*

#### *Machine Learning Intern*

**Jun. 2021 – Aug. 2021**

- Developed a GNN-based cardiovascular disease prediction model to assist in early detection and prevention.

### **General Motors**

*Milford, Michigan*

#### *Software Integration Engineer*

**Jun. 2020 – Oct. 2020**

- Designed software testing/validation procedures for rollover, side, and front collisions in development vehicles.
- Analyzed ECU communication signals and CAN traffic to resolve issues in development vehicles.

### **General Motors**

*Bedford, Indiana*

#### *Electrical Engineering Intern*

**May 2019 – Aug. 2019**

- Wrote software for a die-casting cooling system resulting in a forecasted savings of 750k/yr.

## Projects

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### **Convex Neural Networks for Stock Price Prediction | University of California, San Diego** **Feb. 2022 – Mar. 2022**

- Using the ideas presented by (Pilanci and Ergen 2020), formulated a two-layer neural network into its dual form equivalent convex network.
- Compared convex network performance with a standard (non-convex) two-layer ReLU in predicting a scalar price change in stock data.
- Implemented a naive trading bot using network predictions to evaluate each model's deployment feasibility.

### **Deep Embedding Clustering of Seismic Data | University of California, San Diego**

**Mar. 2021 – Jun. 2021**

- Implemented a deep embedded clustering (DEC) model to interpret unlabeled seismic data collected from Antarctica.
- Tested a new DEC model by replacing the autoencoder with U-Net to compare clustering performance between the two approaches.

### **Spotify User Discovery Application | University of California, San Diego**

**Mar. 2021 – Jun. 2021**

- Created an AWS hosted web application to provide Spotify users a platform to learn about their music listening tastes and trends.
- Built interactive UI displays and created a music recommender system using collaborative filtering and cosine similarity.

### **Domain Adaptation using Small Group Learning | University of California, San Diego**

**Jan. 2021 – Mar. 2021**

- Worked with a team of graduate students to build upon a ML model based on human peer-to-peer learning known as small group learning (SGL) (Du and Xie, 2020).
- Integrated domain-adversarial neural networks into SGL model approach to evaluate SGL as a solution to domain adaption problems.