

Nathanael Lu

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Education

University Of Michigan

Ann Arbor, MI

BSE in Computer Science, BS in Honors Mathematics

May 2026

- GPA: 4.00/4.00
- Coursework: Data Structures & Algorithms, Computer Architecture, Statistics, Linear Algebra, Differential Equations
- USAMO index score of 197

Work Experiences

Software Development Engineer Intern

Lake Orion, MI

American Battery Solutions

March 2024 – October 2024

- Actively maintained and developed an internal tool used by **50+** employees for battery testing and validation.
- Added data visualization capabilities to the Battery Management System built with **Flask**, using **Polars** and **Seaborn** to plot temporal heatmaps for battery cell data, leading to a **33%** increase in pre-production anomaly detection.
- Implemented file caching and automated system format detection, leading to a **93%** reduction in redundant storage.
- Introduced wildcard callbacks to support analysis involving multiple products to increase validation efficiency by **65%**.

CTO

Ann Arbor, MI

LetsPark

June 2024 – Present

- Led two teams to develop a client **IOS** application using **Flutter** and an admin panel using **Next.js**, built authentication with **Firebase** and **Google Cloud** for Maps SDK, Places API, and distance matrix calculations.
- Designed an API leveraging **MongoDB** geospatial queries for an **80%** decrease in spot-matching time.
- Architected a load-balancing **AWS EC2** backend and CDN, utilizing **Cloudflare** proxying with **99%** uptime.
- Developed a NextJS web application using **Google Analytics** to automate lead tracking, increasing conversions by **30%**.

Programming Projects

Tacult AI | Python, C++, PyTorch, NumPy, ONNX Runtime

January 2025

- Designed a three-stage platform to experiment, test, and deploy an AI Ultimate-Tic-Tac-Toe reinforcement learning AI using inspiration from a paper by **Google Deepmind**, and achieved a win rate of 100% against other AIs found online.
- Embedded C++ native code with Nanobind Python bindings for efficient development and faster training, achieving superhuman performance with less than 8 CPU hours of training, utilized ONNX Runtime WASM for native deployment.

Botris-Interface | Python, C++, PyPI, GitHub Actions, CICD

December 2024

- Prototyped a **Python library** for a Tetris AI tournament that enabled 10+ developers to develop powerful bots quickly.
- Leveraged **GitHub Actions** to conduct **CICD** pipelines with verbose testing for over **75%** source code coverage.
- Used **Nanobind** to accelerate performance-critical systems embedded in Pythonic class interface for ease of use. Compiled cross-platform binaries on the cloud using **CIBuildWheel** for consistently compatible distributions.

Neurocity Crown Lead | Javascript, React Native, Expo, Node.js, Firebase

March 2024

- Created an AI-based EEG analysis tool utilizing Neurocity Crown; architected and prototyped a **React Native** mobile application designed using **Figma**, integrating **Expo** frameworks and **Firebase** for multi-factor authentication.
- Utilized Agile software development to ensure efficient project management, following a strict timeline within collaborative, cross-disciplinary teams and employing Scrum methodologies to meet project deliverables.

Optiver Kaggle Lead | Python, Tensorflow, Pandas

November 2023

- Directed a team in a Kaggle competition to identify trading opportunities related to closing price movement, utilizing an ensemble of models with **TensorFlow** to achieve predictions with **87%** accuracy with only 5 GPU hours of training.
- Advanced predictive modeling through hyperparameter optimization using Optuna and Neptune.ai, and leveraged Pandas for sophisticated data manipulation, resulting in enhanced feature engineering and model performance.

Skills

Languages: C++, Python, C, Dart, Javascript, Typescript, SQL, C#, R, Rust

Frameworks: Pandas, PyTorch, NumPy, TensorFlow, Flutter, React.js, Next.js, Node.js, Dash, Firebase, MongoDB, Nanobind

Developer Tools: Git, Linux, CICD, GitHub Actions, Docker, Figma, GDB, Bash/Shell Scripting