Nathanael Lu

248-680-9918 | lunathan@umich.edu | in/lunathanael | github.com/lunathanael

Education

University Of Michigan **Expected Graduation: May 2027**

B.S.E. in Computer Science, B.S. in Honors Mathematics | GPA: 3.94/4.00 *Ann Arbor, MI*

- **Relevant Coursework:** Data Structures & Algorithms, Computer Architecture, Web Systems, Computer Security, Discrete Math, Statistics, Abstract Algebra, Differential Equations, Linear Algebra
- **Clubs:** PM @ Imagine Software, Michigan Data Science Team, Mathematics Club, AI Club, V1 Startups
- USAMO index score of 197

Work Experience

Software Development Engineer Co-op **March 2024 – July 2025**

American Battery Solutions *Lake Orion, MI*

- Built an internal data analysis tool for battery testing used by **50+** employees, integrating user-driven features like URL-based plot sharing, file caching, and AI-guided graphing that reduced plotting latency by **40%**.
- 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 anomaly detection.
- Implemented file caching and automated system format detection, leading to a **93%** reduction in wasted storage.

Co-Founder **May 2024 – June 2025**

LetsPark LLC *Ann Arbor, MI*

- Founded LetsPark, a mobile platform connecting hosts with available driveways and football fans during gamedays; secured **$10K** from competitions, pitched to angel VCs, generated a waitlist of over **300** in under two weeks.
- Led two teams to develop an IOS mobile app using Flutter and an admin panel with Next.js, integrating Firebase for authentication, and Google Cloud Computing such as Maps SDK and Places API for real-time matching.
- Designed a scalable API using MongoDB geospatial queries, achieving an **80%** reduction in spot-matching time, and architected a high-availability backend on AWS EC2 with Cloudflare CDN to ensure **99%** uptime.

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/draw rate of **91%** against online AI.
- Embedded C++ native code with Nanobind Python bindings for efficient 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.
- Leveraged GitHub Actions to conduct CICD with automated 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.

Optiver Kaggle Competition | *Python, Tensorflow, Pandas* **November 2023**

- Directed a team in a Kaggle competition to identify trading opportunities related to stock prices, utilizing complex models in 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.

Neurosity Crown | *Javascript, Python, Pandas, React Native, Expo, Node.js, Firebase* **November 2023**

- Created an AI-based EEG analysis tool utilizing Neurosity Crown; architected and prototyped a React Native mobile application designed using Figma, integrating Expo frameworks and Firebase for 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.

Skills

Languages: C++, Python, C, Javascript, Typescript, Dart, SQL, Assembly, C#, R, Rust
Frameworks: Flutter, React.js, AWS, Cloudflare, Next.js, Node.js, Dash, Firebase, MongoDB
Developer Tools: Git, Linux, CICD, GitHub Actions, Docker, Figma, GDB, Ghidra, Bash/Shell Scripting
Libraries: Seaborn, Flask, Pandas, PyTorch, NumPy, TensorFlow, Nanobind