Nathan Leung

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EDUCATION

Massachusetts Institute Of Technology **Aug. 2024 - Present**
Bachelor Of Science (BS) - Electrical Engineering & Computer Science, Mathematics Minor **Cambridge, MA**

- Designed **2** printed circuit boards (Solstice vehicle **lightboard** and **dashboard**) from scratch and programmed embedded **C** firmware for both boards with the **MIT Solar Electric Vehicle Team**.
- Leading saxophone section of **7** members in chamber and concert performances with the **MIT Wind Ensemble**.
- Coordinating monthly worship services and organized music teams with **MIT Cru Campus Ministries**.

EXPERIENCE

IBM Research **Oct. 2024 - Present**
Machine Learning Research Intern Cambridge, MA

- Developed **TITAN**, a graph transformer foundation model to automate op-amp topology and sizing across **11** performance specs in collaboration with MIT Professors **Anantha Chandrakasan** and **Ruonan Han**.
- Built a **Cadence Spectre** netlist simulation pipeline on a **Linux** server, running **1,000+** AC, DC, noise, and transient simulations per netlist to extract **2,000+** performance metrics from **12,000+** unsized netlists for model training.
- Implemented a multi-objective **TuRBO** optimization algorithm that improved op-amp gain, bandwidth, phase margin, and power consumption performance by **~10,000%** in **~20** simulation runs.

MIT EECS **Sep. 2024 - Present**
Software Engineering Research Intern Cambridge, MA

- Built **PeakProphet**, an LC-MS compound identification pipeline combining retention time, lambda max, and mass spectrometry prediction models with matrix-based scoring, enabling compound identification at rates of **85%** accuracy in collaboration with MIT Professor **Connor Coley**.
- Curated **AMAX** (**40,016** datapoints) & **ReTiNA** (**4,359,188** datapoints) benchmark datasets to train transformer models for predicting lambda max and retention time, achieving $\mathbf{R^2 = 0.87}$ and rivaling leading architectures on smaller datasets.
- Automated a **TECAN i1000Pro** plate reader using **Wireshark** packet analysis and low-level **Python**, integrating with the Coley Research Group's centralized web application, **Lab Master**, for fully remote experiment control.

PROJECTS

FirmaForge [Link] Click • QEMU • Magic • SquashFS **Version 1.0.0**

- A firmware analysis toolkit for Linux embedded devices, automating extraction, fuzzing, and repacking for IoT firmware images across **5+** file types, reducing manual analysis time by **~70%**.

Personal Website [Link] React • TypeScript • Tailwind CSS • Vite **Version 1.0.0**

- Showcases projects with interactive animations and icons, highlighting graphic design and frontend development skills.

SKILLS

- **Languages:** Python, C, Java, JavaScript, TypeScript, Bash
- **Frameworks & Libraries:** PyTorch, FastAPI, React, Tailwind CSS, Vite
- **Tools:** Cadence Software, MATLAB, Altium Designer, Docker, Git

HONORS/AWARDS

MIT UPOP Fellowship **Apr. 2025**

- Selective MIT career development program with unique workshops and mentorship opportunities.

MIT Emerson-Harris Scholarship **Sep. 2024**

- In recognition of outstanding achievement in scholarship and jazz performance at MIT.