Benjamin Ye

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Education

Northwestern University Evanston, IL
Master of Science in Computer Science *September 2025 – March 2027*

Northwestern University Evanston, IL
Bachelor of Science in Computer Science *September 2022 – December 2025*

- Cumulative GPA: 3.8/4.0
- Select coursework: Compilers, Parallelism, Networks, Machine Learning, Algorithms, Data Structures, Agile

Technical Skills

Programming Languages: C/C++, Rust; Shell/Bash; HTML/CSS, Java, JavaScript, MATLAB, Python, Racket, SQL
Software/Tools: Git, Make/CMake, Unix/Linux; LLVM, OpenMP; AWS, Docker, Firebase, Postgres, React.js; Microsoft Office

Work Experience

Wells Fargo Columbus, OH
Software Engineer Intern *June 2025 – Present*

- Modernizing core banking systems by detangling legacy functionality from new APIs, improving speed and resiliency
- Automating banking functions by creating AI-based tooling to reduce response time to customer rate inquiries
- Leveraging generative AI to accelerate ideation and development cycles, doubling story velocity

Northwestern University Department of Computer Science Evanston, IL
Compiler Research Assistant *March 2024 – Present*

- Analyzing **LLVM-IR** generated by **C, C++, and Rust compilers** to compare structure and quality of generated code
- Writing an **LLVM pass** to track **170+ code metrics** for comparison, including **LLVM attributes** and **def-use chains**
- Built a **Rust frontend** for the **MemOIR compiler**, which generates novel memory optimizations for C/C++

Northwestern University Department of Computer Science Evanston, IL
Peer Mentor January 2024 – June 2025

- Devoted 6-10 hours per week to **assist 200+ students in Intro to AI** understand course content
- Offered personalized 1-on-1 guidance through regular office hours to help students with AI concepts and debugging
- Promptly addressed over 10% of all student inquiries on Campuswire/Piazza about course material and logistics, creating an open learning environment beyond traditional class hours

Projects

NU Miku *January 2025 – Present*

- Writing a Discord bot in Python to provide community-related utilities for **1,500+ Northwestern Esports members**
- Implementing requested features to streamline esports team processes and **increase club engagement by 40%**
- Using **Postgres** and **Docker compose** to manage persistent data and streamline deployment

F-STARS *October 2024 – October 2024*

- Designed an embedded system to **efficiently filter seismic signals** on Mars with an FPGA and a microcontroller
- Assembled a **compiler toolchain** to deploy a PyTorch model to FPGA with **the LLVM ecosystem**, accurately detecting **>85% of seismic events** with minimal energy and compute overhead
- Won the **"Most Innovative" award** at NASA Space Apps Chicago 2024

Purple Hours *March 2024 – June 2024*

- Developed a group-based queue system using React.js to **double the number of students helped** per office hours session in Northwestern CS courses
- Hosted the app and its database on Firebase, allowing immediate data updates and seamless operation

LB to x86_64 Compiler *January 2024 – March 2024*

- Built a compiler that efficiently **compiles a C-like language into x86_64** using **C++**
- Implemented **modern compiler backend techniques** such as register allocation with live variable analysis and graph coloring, and instruction selection using maximal munch and tree covering
- Used PEGTL to parse input, handle desugaring, and generate memory representations transformable by the compiler