Benjamin Ye

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Education

Northwestern University Evanston, IL
Master of Science in Computer Science *September 2025 – December 2026*

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

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, MySQL, Postgres, React.js; Microsoft Office

Work Experience

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++

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

- Led modernization of a core banking UI to React with an **agile team of 15 engineers**, resolving CI/CD pipeline failures caused by legacy UI incompatibility and enhancing code maintainability
- Wrote documentation on setup and GenAI workflows, assisting adoption and knowledge transfer across 3 teams
- Presented workflow/architecture improvements to **2 senior leaders**, establishing project impact and strategic value

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 questions on Campuswire/Piazza about course material and logistics

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 **increase club engagement by 40%** and streamline esports team processes
- 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 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