

# Benjamin Ye

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## Education

### Northwestern University

Bachelor of Science in Computer Science

Evanston, IL

Expected March 2027

- Cumulative GPA: 3.8/4.0
- Relevant Coursework: Compilers, Programming Languages, Algorithms, Data Structures, Networks, 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; AWS, Docker, Firebase, Postgres, PyTorch, React.js; Microsoft Office

## Work Experience

### Wells Fargo

Backend Software Intern

Columbus, OH

June 2025 – Present

- Modernizing code 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

Compiler Research Assistant

Evanston, IL

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**
- Previously built a **Rust frontend** for the **MemOIR compiler**, which generates novel memory optimizations for C/C++

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 using 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

### PairingsBot

November 2023 – April 2025

- Wrote a Discord bot in **Python** that automatically sends debate tournament pairings from Tabroom in a server, shaving **30+ minutes off team logistics between rounds** per tournament for Northwestern's debate team
- Scraped Tabroom's HTML using BeautifulSoup4 to gather round information and generate unique pairings analysis