

# 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 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 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