Benjamin Ye

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Education

Northwestern University Evanston, IL
Bachelor of Science in Computer Science *Expected June 2026*

- GPA: 3.7/4.0
- Relevant Coursework: Compilers, Programming Languages, Algorithms, Data Structures, Networks, Agile, Intro to AI

Technical Skills

Programming Languages: C/C++, Rust; JavaScript, Python, SQL, Shell/Bash
Software/Tools: Git, Make/CMake, Unix/Linux; Firebase, PyTorch, React.js, Microsoft Office

Work Experience

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

- Writing a **Rust frontend for the MemOIR compiler** that generates 3 novel memory optimizations for C and C++
- Extending MemOIR with a custom compilation chain to match **over 60% of Rust's API** for Vec and HashMap
- Writing **100+ unit and integration tests** to validate output and benchmark efficiency

Peer Mentor January 2024 – March 2024

- 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 about course material and logistics, creating an open learning environment beyond traditional class hours

Northwestern University Debate Institute Evanston, IL
Lab Leader *July 2022 – August 2023*

- Coached 50+ high school debaters from across the world through lectures on debate theory and structuring targeted drills to build proficiency in topics such as AI, cybersecurity, fiscal policy, international relations, and current events
- Led the largest lab by judging 4+ hours of debates per day and facilitating evening office hours to refine students' argument generation skills and speaking mechanics

Projects

F-STAR *October 2024 – October 2024*

- Designed an embedded system to **efficiently filter seismic signals** on Mars with an FPGA and a microcontroller
- Wrote a **compiler chain** to **deploy a PyTorch model to FPGA**, 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 with **C++** that efficiently **compiles a C-like language into x86_64**
- 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 – Present*

- 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
- Scraped Tabroom's HTML using BeautifulSoup4 to gather round information and generate unique pairings analysis

Additional Information

Awards: R&B Feldmann Fellowship, John B. Kirk Award (2x), Milton S. Florsheim Prize (2x)
Interests: Ferrets, Possums, Piano, Speedcubing, Debate, International Relations, Legal Personhood, Valorant