Benjamin Ye

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EDUCATION

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

- Cumulative GPA: 3.7/4.0
- Relevant Coursework: Compiler Construction, Design & Analysis of Algorithms, Intro to AI, Data Structures and Algorithms, Agile Software Development

TECHNICAL SKILLS

Programming Languages: C, C++, CSS, HTML, JavaScript, MATLAB, Python, Racket, Rust
Software/Tools: React.js, Visual Studio Code, Firebase, Vite, Wireshark, Microsoft Office (Word, PowerPoint, Excel)

WORK EXPERIENCE

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

- Working with ARCANA Lab to pioneer advanced compilation techniques aimed at improving memory and runtime efficiency of compilers and their outputs
- Writing a Rust frontend for the MemOIR compiler that uses Rust's memory properties to generate stronger optimizations

Peer Mentor *January 2024 – March 2024*

- Devoted 6-10 hours per week to assist 200+ students in COMP_SCI 348 (Intro to AI) in understanding course material
- Offered 1-on-1 guidance in office hours to help students understand course content and debug complex code
- Actively engaged with student inquiries on Piazza to promptly address questions and deliver thorough explanations to clarify subject matter, contributing to an effective 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 country by formulating lectures on debate theory and structuring targeted drills to build proficiency in debating topics such as artificial intelligence, cybersecurity, and current events
- Led the largest lab by evaluating practice speeches, judging daily practice debates, and facilitating evening office hours to refine students' speaking mechanics and argument generation skills
- Directed the camp tournament by overseeing logistics, ensuring a seamless and engaging experience for all students

PERSONAL PROJECTS

LB to x86_64 Compiler (C++)

- Built a compiler that compiles a C-like language into x86_64
- Implemented modern compiler backend techniques such as register allocation using liveness analysis and graph coloring, and instruction selection using tree covering
- Used PEGTL to parse input into a memory representation processable by the compiler and handle front-end features

Purple Hours (Javascript, React.js)

- Built a group-based office hours queue system using React.js to increase the number of students helped per session
- Used Firebase to host the web app and dynamically update the queue, allowing seamless operation
- Implemented agile practices to rapidly iterate and improve team cohesion during development

PairingsBot (Python)

- Built a Discord bot used by Northwestern's Debate Society using discord.py, streamlining the debate competitor experience by automatically sending debate tournament pairings to a dedicated Discord channel
- Employed BeautifulSoup4 and Tabroom's API to scrape round information from Tabroom with minimal network strain
- Demonstrated proficiency in programming best practices by performing iterative testing across multiple tournaments and writing comprehensive usage documentation on GitHub to ensure code maintainability and simplify future development

ADDITIONAL INFORMATION

Awards: John B. Kirk Award, Milton S. Florsheim Prize
Interests: Ferrets, Possums, Piano, Speedcubing, Debate, US-China Relations, Legal Personhood, Valorant