

Joshua Goldberg

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Education

Northeastern University - Boston, MA | Khoury College of Computer Sciences

Candidate for a B.S. in Computer Science, Minor in Mathematics

Sept 2023 - Present

Expected April 2027

Honors: GPA 4.0/4.0 | Dean's List (4 semesters) | Honors Scholarship

Relevant Courses: Software Engineering, Programming Languages, Algorithms (Graduate), [CS7470](#) Influential Ideas in Programming Languages (Audit), Object Oriented Design, Distributed Systems, Accel Fundamentals CS 1 & 2

Knowledge/Expertise

Programming Languages: Lean, Java, Python, Javascript/TypeScript, HTML/CSS, Rocq, OCaml, Racket, C

Applications/Systems: Git, Docker, Node.js, React, Postman, VSCode, Prisma, DrRacket, Qt, IntelliJ, PyCharm, n8n

Projects

OwlLean [\[source\]](#)

Aug 2025 - Feb 2026

- Developed a typechecker and parser in Lean 4 for [Owl](#), integrating subtyping, information flow, and label corruption
- Implemented bidirectional typing inference and automatic tactics for proof generation to enable more robust representations and ensure proper typechecking of arbitrary information flow constraints
- Constructed example cryptographic programs to emulate and typecheck concurrency using state machines
- Devised performance optimizations, improving runtimes by over 2x compared to unoptimized tests

Cybersecurity TA Discord Bot [\[source\]](#)

June 2025 - Nov 2025

- Led the development of a Retrieval-Augmented Generation integrated discord bot leveraging Python, GPT-4 API, and [n8n](#) workflow automation to assist 200+ students with cybersecurity coursework
- Authored and presented research at CISSE, demonstrating system design and an 80% student helpfulness rating

Osu!mania Replay Renderer [\[source\]](#)

Aug 2024 - March 2025

- Implemented a Java application that parses LZMA compressed game data and converts it to MP4 format by recreating the game environment, using 7Zip and FFmpeg
- Iteratively refined rendering accuracy and performance through user feedback, achieving sub-minute render times via optimized OOP design patterns with additional user configurable optimization options

Lean Measure

Nov 2025 - Present

- Collaborating weekly with researchers to develop a Lean 4 theorem prover grounding probabilistic programming in measure theory and separation logic

Experience

Research Assistant - Northeastern University - Boston, MA

Jul 2025 - Present

- Designing automated typechecking methods for cryptographic languages (e.g., [Owl](#)) in Rocq and Lean 4
- Proved non-interference and well-bracketed lemmas across multiple security language representations

Technical Lead - Northeastern University Electric Racing - Boston, MA

April 2025 - Present

- Lead a team of 5+ developers working in React and TypeScript, assigning tickets and reviewing pull requests weekly
- Overhauled the Finance and Calendar pages via Prisma and SQL filtering, cutting management overhead and improving load times for 100+ members across multiple subteams

Logic and Computation Teaching Assistant - Northeastern University - Boston, MA

Jan 2025 - Present

- Mentor 70+ students through weekly office hours, preparing them for proof-based exams and assignments in formal logic and property-based testing
- Maintain autograder infrastructure and course documentation in Racket and OCaml, and collaborate with faculty to design assignment rubrics and exam problems

Interests : Piano | Theorem Provers | American Numismatics | Programming Languages