Joshua Goldberg

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Education

Northeastern University - Boston, MA | Khoury College of Computer Sciences *Sept 2023 - Present*
Candidate for a B.S. in Computer Science, Minor in Mathematics *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

Lean Measure *Nov 2025 - Present*
- Mechanizing aspects of measure theory and sigma algebras to create a version of Lilac using Lean 4
- Constructing a measure theory based framework defining probability spaces, and writing a separation logic on top of it to reason about probabilistic programs

OwlLean [source] *Aug 2025 - Dec 2025*
- Developed a typechecker and parser in Lean 4 for the Owl, integrating subtyping and information flow
- Implemented bidirectional typing inference and automatic tactics for proof generation to enable more robust representations and ensure proper typechecking of arbitrary information flow constraints
- Devised performance optimizations, improving typechecking time by over 200% compared to unoptimized runs

Cybersecurity TA Discord Bot [source] *June 2025 - Aug 2025*
- Lead the development of an AI integrated discord bot leveraging GPT-4 API, Python, and n8n workflow automation to assist students with general cybersecurity questions and coursework
- Used in both remote and online versions of Northeastern's foundational cybersecurity course, serving 200+ students
- Wrote and presented at CISSE, showcasing system design and positive classroom deployment statistics

Experience

Research Assistant - Northeastern University - Boston, MA *Jul 2025 - Present*
- Advised by Joshua Gancher, working with Rocq and Lean 4 to formalize features of Owl and Lilac
- Realizing novel ways to express typechecking, allowing for more automated systems utilizing proofs

Technical Lead - Northeastern University Electric Racing - Boston, MA *April 2025 - Present*
- Oversee a team of web developers using React and Typescript to develop the team website.
- Updated the Finance and Calendar pages, allowing for significantly easier tracking of allocated team funds and meeting schedules, alongside improved efficiency through the utilization of Prisma and SQL for backend filtering

Logic and Computation Teaching Assistant - Northeastern University - Boston, MA *Jan 2025 - Present*
- Host weekly office hours and engage with students to properly prepare them for future course content and work
- Help improve the course documentation and autograder infrastructure written in both Racket and OCaml
- Grade exams and homework weekly, providing insightful feedback and aiding in the design of assignment rubrics

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