

ALEX FRIEDMAN

ahfriedman.com/

Education

Illinois Institute of Technology, Chicago, IL

Ph.D in Computer Science *GPA: 4.00/4.00*

Aug. 2024–Present

Advisor: Stefan Muller

Worcester Polytechnic Institute (WPI), Worcester, MA

M.S. in Computer Science *GPA: 4.00/4.00*

Dec. 2023

Thesis: Regular Session Types · Advisor: Rose Bohrer

B.S. in Computer Science & Professional Writing *GPA: 3.97/4.00*

May 2023

Awards

Salisbury Prize, WPI

2023

Provost's Major Qualifying Project Award, WPI

2023

Outstanding Junior Award - Honorable Mention, WPI Computer Science Dept.

2022

Computer Science Senior Award, Woodson HS Computer Science Dept.

2019

Publications

Alex Friedman. Regular session types, 2023. (*Master's thesis*)

Alex Friedman. Communicating with distributed process calculus, 2023. (*Bachelor's thesis*)

Research Experience

Regular Session Types | *Advisor: Prof. Rose Bohrer*

May 2023–Present

- Created a binary, synchronous & classical session-typed calculus in which we prove a direct correspondence between session types and regular languages.
- Proved type safety; that programs & session-types can be synthesized from an arbitrary regular language, and vice-versa.

Bismuth Programming Language | *Advisors: Profs. Rose Bohrer & Yunus Telliel* May 2021–Present

- Developed & proved correctness of a novel asynchronous session calculus that enables the intuitive use of session types in traditional control flow structures including loops.
- Created & used a low-cost yet audience-centered framework for the rapid prototyping of programming languages based on principles of rhetoric & communication.
- Implemented Bismuth, a session-typed programming language based on these theories w/ online compiler at bismuth-lang.org.
- Wrote 146pg bachelor's thesis detailing this work & presented at WPI in two sessions.
- Currently researching adding exceptional sessions to Bismuth & implementing a language, platform agnostic network protocol based on these session types.
- Received Provost's Major Qualifying Project (MQP) Award.

Assisting Romanian Startups | *Advisors: Profs. Robert Kinicki & Althea Danielski* Jan. 2022–May 2022

- Lead a team of 4 students helping the American Chamber of Commerce in Romania (AmCham).
- Researched differences between the US and Romania (historically, economically, socially, etc.) to better understand the needs and experiences of people living in Romania.
- Conducted interviews, case studies, and observational research to further expand our understanding & identify ways AmCham could help startups be successful based on their existing resources.
- Wrote and edited a report, resource guide, and infographic detailing these findings, how they could be implemented & examples of organizations who had implemented similar programs or that AmCham could collaborate with.
- Presented to our collaborators at AmCham & our advisors.

Work Experience

Software Engineer II, Juniper Networks Dec 2024–Aug. 2024

Software Engineering Intern, Juniper Networks May 2023–Aug. 2023

- Added functionality to Juniper’s Session Smart Router (SSR) and CLI that helps facilitate common troubleshooting, configuration management, & debugging workflows.
- Created unit & end-to-end tests to ensure correct functionality of features.
- Identified & patched security vulnerabilities.
- Reached out & collaborated with people on various teams to achieve these goals.
- Presented work at a site-wide intern showcase event.

Student Assistant (SA), WPI Computer Science Dept. Sept. 2022–Dec. 2022

- Served as the SA for a class of 36 students taking CS 5084 (Graduate level intro to algorithms).
- Met with students (via office hours, email, and Discord) to answer questions about/help them understand course content and helped proctor tests.

Special Projects Intern, Vectra May 2022–Mar. 2023

- Using Vue, Node.js, Express.js, and MongoDB, worked as a full-stack developer on internal applications which enabled Vectra’s MDR service by streamlining analyst workflow, improving communication (between analysts and between analyst and customer), and tracking progress towards service level objectives.
- Full-time internship (May 2022–Aug. 2022) extended to part-time (Aug. 2022–Mar. 2023)

Senior Information Security Assistant, WPI Aug. 2020–Aug. 2022

Information Security Assistant, WPI Nov. 2019–Aug. 2020

- Developed tools and reports in Splunk & Azure Sentinel that helped Information Security investigate network anomalies/detections, communicate, and track progress.
- Wrote and edited standard operating procedure describing how to process website unblock requests.
- Identified network anomalies & assisted users to secure such devices.
- Authored two articles during COVID posted on the WPI Hub discussing how to stay safe online.

Intern, George Mason University Summer 2018

- Implemented features into the agent-based modeling environment (MASON) for a project lead by Dr. William Kennedy studying the effects and response to disasters in New York City.

Projects

Brigham & Women’s Hospital Kiosk | *Software Engineering Course, WPI* Mar. 2021–May 2021

- Lead software engineer of a team of 11 students using Git, JavaFX, and SQL.
- Included user creation & authentication, COVID screening, an interactive map (editable by hospital staff), directions (to locations withing and to/from the hospital), and service requests.
- Successfully developed application using Agile/Scrum methodology in 7 weeks.

Conntinuity | *Peer-to-Peer File Synchronization & Remote Desktop Application* Aug. 2019–Sept. 2021

- Created a cross-platform application to link computers with file synchronization and application streaming over a secure peer-to-peer network that built with Node.js, Java, C++, C#, and git.

Eclipse IDE User Guide | *Technical Writing Final Project, WPI* Feb. 2021–Mar. 2021

- Wrote and edited a user guide for the Eclipse IDE.
- Applied style guide to ensure consistency of document.

ColIDE | *Collaborative Integrated Development Environment (IDE)* Feb. 2018–Dec. 2019

- Worked with another student to develop an IDE that enabled real-time collaboration on programming projects through intelligent file syncing via secure peer-to-peer networks.

Skills

Programming Languages: C/C++, Java, Node.js, MongoDB
Technologies & Tools: Linux, Git
Frameworks: MERN Stack, Vue.js
Interdisciplinary: Writing, Editing

Leadership / Extracurricular

Graduate Student Representative , WPI Computer Science Dept.	Sept. 2023–Dec. 2023
Treasurer , WPI Cybersecurity Club	2020-2022
President , WPI Society of Magicians	2020-2021