

# ALEX FRIEDMAN

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## Education

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**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

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**Salisbury Prize**, WPI Computer Science Dept.

2023

**Provost's Major Qualifying Project Award**, WPI Professional Writing Program

2023

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

2022

**Computer Science Senior Award**, Woodson HS Computer Science Dept.

2019

**Eagle Scout**

2017

## Publications

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**Alex Friedman** and Rose Bohrer. Regular session types. In *FoSSaCS*, 2024. (*Under review*)

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

## Research Experience

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**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.
- Under review at FoSSaCS 2024.

**Bismuth Programming Language** | *Advisors: Profs. Rose Bohrer & Yunus Telli* 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](http://bismuth-lang.org).
- Wrote 146pg report detailing this work & presented at WPI in two poster presentation 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

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**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

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**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 within and to/from the hospital), and service requests.
- Successfully developed application using Agile/Scrum methodology in 7 weeks.

**Continuity** | *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

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**Programming Languages:** C/C++, Java, Node.js, MongoDB

**Technologies & Tools:** Linux, Git

**Frameworks:** MERN Stack, Vue.js

**Interdisciplinary:** Writing, Editing

## Leadership / Extracurricular

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**Graduate Student Representative,** WPI Computer Science Dept.

Sept. 2023–Present

**Treasurer,** WPI Cybersecurity Club

2020-2022

**President,** WPI Society of Magicians

2020-2021