

Ajay Tatachar

URH 324 Babcock, 1002 College Ct., Urbana, Illinois 61801, USA
ajaymt2@illinois.edu • +1 (312) 687-4800 • <https://ajaymt.github.io/>

EDUCATION

University of Illinois at Urbana-Champaign, Urbana, Illinois, USA

- B.S. in Molecular and Cellular Biology
- Cumulative GPA: 3.94

Aug 2018 – May 2022 (Expected)

WORK EXPERIENCE

CS 125: Introduction to Computer Science

- **Course Developer** Jan 2019 – May 2019
 - Developed jtrace, a JVM native agent that traces program state.
 - Developed java-complexity, a static code analysis tool that calculates cyclomatic complexity. Used to gather data on student homework submissions.
 - Worked on janini, an online Java execution platform designed for educational use.
 - Held ~4 office hours per week to help students with assignments and answer questions.
- **Office Hour Captain** Aug 2019 – Present
 - Helped coordinate office hours for a class of ~900 students and ~100 Course Assistants.
 - Held ~10 office hours per week to help students with assignments and answer questions.
 - Organized and conducted Course Assistant Training to make office hours more effective and efficient.

PROJECTS

- **Mako**: Operating System for 32-bit x86 computers *Summer 2019*
 - Supports a Linux-compatible ext2 filesystem, pre-emptive and cooperative multitasking, graphical user interface and much more.
 - Developed in approximately six months entirely from scratch.
- **thorin**: debugger for C programs on Linux and macOS *Spring 2019*
 - Traces debuggee using ptrace (linux) or mach ports (macOS) and reads DWARF-formatted debug information
 - Provides GDB-like state-inspection features.
 - Implemented in Rust and C.
- **Golsp**: Interpreted, general purpose lisp-like programming language *Fall 2018*
 - Implemented entirely in Go and itself.
 - Features a standard library that provides file I/O routines and an extensible module system.
 - Functional purity and Go runtime make it a good fit for concurrent applications.
- **crunch**: memory profiling and debugging tool for macOS *Spring 2019*
 - Tracks memory allocations in C/C++ programs and detects leaks and errors.
 - Uses the DYLD_INSERT_LIBRARIES mechanism to override memory management functions.
- **trash-detector**: 36-hour hackathon project developed with two teammates *Spring 2019*
 - Convolutional neural network that detects trash (plastic bottles, crushed cans, etc.) in images.
 - Gathered data manually (because of a lack of comprehensive trash datasets) to train network.
 - Connected the neural network to a web backend and exposed an API to scan and highlight trash in images.
 - It actually works!
- Many more open source projects.

SKILLS

Systems Programming

- Proficient in languages suited for high-performance computing: C, Rust, C++ and Go.
- Familiar with the x86 architecture: memory virtualization, context switching mechanisms, interrupt handling etc.
- Experience writing system software for linux and macOS.
- Experience programming a multi-tasking operating system kernel capable of hosting user programs and interfacing with common hardware devices.

Programming Languages

- Experience designing and implementing a general-purpose programming language from scratch.
 - Working with ANTLR and yacc LALR(1) and LR(1) grammars, and implementing a parser by hand.

Machine Learning

- Familiar with convolutional neural networks and their applications in image processing.
- Experience implementing simple classification algorithms for tasks like sentiment analysis and image recognition.