

# DONALD PINCKNEY

Boston, MA

pinckney.d@northeastern.edu · <https://donaldpinckney.com> · (530) 220-3327

## EDUCATION

---

**Northeastern University** Sep 2020 – Present  
*PhD in Computer Science*

- Advised by Dr. Arjun Guha, focusing on automated and data-driven reasoning of package management and supply chain reliability & security

**University of Massachusetts Amherst** Sep 2018 – May 2020  
*MS in Computer Science, GPA: 3.87*

- Advised by Dr. Arjun Guha and Dr. Yuriy Brun, focused on type systems and formal semantics in programming languages
- Relevant courses: Compilers (A), Programming Languages (A), Advanced Programming Languages (A), Algebraic Topology (A), Machine Learning (A), Neural Networks (A)

**University of California Davis (graduated with highest honors, top 4%)** Sep 2014 – Jun 2018  
*B.S. in Computer Science & Engineering, GPA: 3.935*  
*B.S. in Mathematics, GPA: 3.951*

- Advisors: Dr. Zhendong Su and Dr. Thomas Strohmer
- Relevant courses: Programming Languages (A), Graduate Programming Languages (A+), 3 Quarters of Abstract Algebra (A, A, A+), Type Theory Special Study Course (P)

## PUBLICATIONS

---

**ICSE 2023** *Flexible and Optimal Dependency Management via Max-SMT*. Donald Pinckney, Federico Cassano, Arjun Guha, Jonathan Bell, Massimiliano Culpo, Todd Gamblin.

**MSR 2023** *A Large Scale Analysis of Semantic Versioning in NPM*. Donald Pinckney, Federico Cassano, Arjun Guha, Jonathan Bell.

**arXiv 2022** *A Scalable and Extensible Approach to Benchmarking NL2Code for 18 Programming Languages*. Federico Cassano, John Gouwar, Daniel Nguyen, Sydney Nguyen, Luna Phipps-Costin, Donald Pinckney, Ming-Ho Yee, Yangtian Zi, Carolyn Jane Anderson, Molly Q Feldman, Arjun Guha, Michael Greenberg, Abhinav Jangda.

**DLS 2020** *Wasm/k: Delimited Continuations for WebAssembly*. Donald Pinckney, Yuriy Brun, Arjun Guha.

**OOPSLA 2019, Distinguished Paper Award** *Formal Foundations of Serverless Computing*. Abhinav Jangda, Donald Pinckney, Yuriy Brun, Arjun Guha.

## EXPERIENCE

---

**Draper, Research Scientist Intern** 2023 – Present

- Working on program analysis techniques to verify properties of binary patches.

**Northeastern University, Programming Research Lab, Graduate Researcher** 2020 – Present

- Scraped a dataset of *every* package uploaded to NPM in real time, with the goal of characterizing how supply chain vulnerabilities flow through the graph of packages. See the dataset at <https://dependencies.science>.

- Implemented MaxNPM, a generalized and optimizing replacement for the NPM package manager, which can find higher-quality solutions than NPM for user-customizable objectives (fewer dependencies, newer dependencies, fewer vulnerabilities, etc.). Implemented using Rosette / Z3, and evaluated on a dataset of 1000 top packages from NPM. Currently under submission at ICSE 2023.

**Uber, Programming Systems Group**, *Programming Systems Research Intern* May 2020 – Dec 2020

- Explored root causes of flaky tests in a large-scale industrial setting.
- Investigated automated reproduction of flaky test failures via constraint solving and record-replay.

**UMass Amherst, PLASMA Research Group**, *Graduate Researcher* 2018 – 2020

- Formulated precise formal semantics for the execution of serverless functions (accepted at OOPSLA 2019)
- Extended WebAssembly with support for delimited continuations (accepted at DLS 2020). For more information, see <https://wasmk.github.io>.

**UC Davis, Dr. Zhendong Su's Lab**, *Undergraduate Researcher* 2017 – 2018

- Researched uniform sampling from context-free grammars in order to more efficiently fuzz test compilers
- Explored verification oriented approaches for defending against adversarial machine learning examples

**UC Davis, Dr. Thomas Strohmer**, *Undergraduate Researcher* 2017 – 2018

- Investigated and attempted to characterize the complex training dynamics of generative adversarial networks
- Applied compressive sensing and random projection techniques to compress and accelerate neural networks

**Apple Inc., macOS Frameworks Team, Intern** Summer 2016, 2017

- Performed maintenance, fixed bugs, and shipped new features for AppKit, the macOS system UI API with ~15 co-workers
- Independently implemented “Show All Tabs” feature for AppKit Window Tabs which shipped in macOS High Sierra
- Presented the “Show All Tabs” project to a panel including Apple senior vice president Craig Federighi and was chosen as a top 10 intern project across Apple
- Investigated constraint solving and optimization for building an iOS / macOS app developer-facing tool

**FileMaker Inc., an Apple subsidiary**, *FileMaker Go Team, Intern* Summer 2015

- Developed a complete user interface unit testing environment for the FileMaker Go iOS app
- Contributed UI feature implementations and bug fixes to the iOS app

## TEACHING AND VOLUNTEERING

---

**Northeastern University CS2500**, *Teaching Assistant* Fall 2021

- Developed curriculum and homework assignments, managed grading of assignments, and ran office hours.

**UMass Amherst COMPSCI 220**, *Teaching Assistant* Fall 2019

- Led discussion sections, graded assignments, and proctored exams

**Holyoke Codes**, *Volunteer Workshop Instructor* July 2019

- Helped run a weeklong middle school and high school workshop on interactive robot programming with JavaScript
- Students went from zero JavaScript knowledge to writing collaborative robot soccer programs

**CS4K**, *Volunteer Instructor* Spring 2017

- Assisted students in a local junior high school programming club with robotics programming in Scratch
- Taught students in a local elementary school programming in Swift, up to coding a maze solving algorithm