

Alex Reinking

Research and Development

Education

- 2016–Present **University of California Berkeley**, *Ph.D. in Computer Science*, Berkeley.
Adviser: Jonathan Ragan-Kelley
- 2012–2016 **Yale University**, *Bachelor of Science*, New Haven.
Computer Science with Distinction; Mathematics

Publications / Awards

- 2016 Department of Computer Science Prize. Yale University.
Achievement Rewards for College Scientists (ARCS) Fellowship Recipient
- 2015 Reinking, Alex, and Ruzica Piskac. “A Type-Directed Approach to Program Repair.” In *Computer Aided Verification*, pp. 511-517. Springer International Publishing, 2015.
Reinking, Alex. “A Type-Directed Approach to Program Repair.” 2nd Place. PLDI Student Research Competition. Adviser: Ruzica Piskac.

Work Experience

Research

- Summer 2018 **Research Intern**, FACEBOOK, Menlo Park.
Designed extensions to the *Halide* programming language to allow pipeline-level, bounded feedback loops. Identified several compiler-level challenges, including necessary IR extensions, a need for a new bounds inference framework, closed forms for diagonalizable bounds equations, and storage optimizations. PI: Zachary DeVito
- Summer 2017 **Research Intern**, MICROSOFT RESEARCH, Redmond.
Designed and implemented a new compiler for the *P* programming language. *P* is designed for modeling communication protocols between parts of a system. It was previously used to implement the USB 3.0 hub driver in Windows 8 and beyond. PI: Shaz Qadeer
- Fall 2014 – Spring 2016 **Research Assistant**, YALE UNIVERSITY, New Haven.
Designed an algorithm to synthesize correct expressions of a given data type, allowing IDEs to present completions of full expressions, instead of a single symbol. Extended this work to repair ill-typed expressions. Implemented results as a Java compiler plugin that attempts to correct type errors. Published at CAV 2015. PI: Ruzica Piskac
- Summer 2014 **Research Intern**, YALE INSTITUTE FOR NETWORK SCIENCE, New Haven.
Designed and implemented algorithms for solving Laplacian linear systems efficiently. Java implementation produces the highest-quality output among its competition. PI: Daniel Spielman
- Summer 2013 **Research Intern**, YALE HASKELL GROUP, New Haven.
Developed interactive musical instrument widgets for the Euterpea project. Researched efficient pure-functional signal representations to facilitate the creation of virtual instruments. Wrote a test suite to identify and correct bugs and a design flaw. PI: Paul Hudak

Industry

- Summer 2016 **Software Development Engineer Intern**, MICROSOFT, Redmond, WA.
Worked with the Intune Core Services team to develop a workflow engine to automate support operations procedures. Framework manages execution, suspension, cancellation, and error recovery for long-running tasks.
- Summer 2015 **Software Development Engineer Intern**, MICROSOFT, Redmond, WA.
Worked on the Intune Core Services team to develop software to improve live-site bug response by providing more detailed diagnostics than were previously available. Also worked to parallelize automated tests on the Azure Batch cloud service to lower project build times.

- 2011–2013 **Web Developer**, AUTOMATION.COM, Eden Prairie, MN.
Developed the backend to the Automation.com website. Fixed a web-security vulnerability that allowed malicious users to apply arbitrary discounts to their orders. Provided technical support to the whole company.
- Summer 2011 **Programmer**, DESARROLLO INTEGRAL DE LA FAMILIA, Puebla, Mexico.
Volunteered for a charitable organization that provides food to Mexico's most impoverished schools. Developed web interface for collection, reporting, and statistical analysis of nutrition data gathered from the students.
[Academia](#)
- Fall 2015 **Undergraduate Learning Assistant**, YALE UNIVERSITY, New Haven.
Teaching assistant for CS50 / CPSC100a. Prepared and led weekly discussion sections for my assigned group of students. Graded and provided feedback on programming assignments to those students. Held weekly office hours. Provided course assistance to staff as required.
- Fall 2015 – **President**, HACKYALE, New Haven.
- Spring 2016 Manage team of teachers of courses designed for students of all backgrounds in web development and software engineering. Taught courses between Fall 2013 and Spring 2015 where I delivered weekly lectures to classes of around 25 students and assigned and graded weekly homework.
- Spring 2014 – **Peer Tutor**, YALE UNIVERSITY, New Haven.
- Spring 2016 Provided assistance on programming problem sets to the students of CPSC 223 – Data Structures and Programming Techniques (S14, S16), and CPSC 323 – Systems Programming and Computer Organization (F14). Guided students individually and in groups on programming problems.
- Spring 2014 – **Undergraduate Course Grader**, YALE UNIVERSITY, New Haven.
- Spring 2015 Graded problem sets for CPSC 432 – Computer Music: Sound Synthesis (S14) and CPSC 365 – Design and Analysis of Algorithms (S15). Wrote individualized grade reports explaining mistakes and offering coding advice in Haskell. Developed tools to automate the grading process.

Projects

- Spring 2015 **Yale CS Petition**, <http://alexreinking.com/petition>.
Developed, maintained, and managed the website to collect signatures for a petition to increase the number of CS ladder faculty at Yale University. Beyond software, managed campaign strategy, and worked closely with fellow undergraduates and graduate students to publicize the petition. Secured over 1,100 signatures. Seven new faculty spots were added within weeks, marking the first expansion of the Yale CS department in 20 years.
- Fall 2014 **Winston**, *Published at CAV 2015*.
Winston is the name of an algorithm and a software engineering tool that synthesizes code snippets in Java. It interactively generates possible completions for arbitrary typed expressions, such as entire variable assignments. It can also repair ill-typed expressions, thereby allowing a programmer to declare their intent with an approximate line of code for Winston to correct.
- Spring 2014 **BooLeX**, <http://boolex.herokuapp.com>.
BooLeX is an interactive tool and Domain-Specific Language for simulating logic circuits. It is meant to be approachable by a new student of electrical engineering, and its goal is to ease exploring and understanding logic circuits with a simple, clean, interface, and straight-forward, unambiguous semantics. It provides a reasonable alternative to VHDL for simple tasks.
- Spring 2014 **Euterpea Real-Time Audio**, <https://github.com/Euterpea/Euterpea>.
Wrote and contributed extension to the Yale Haskell Group's Euterpea library that allows it to render signals directly to various audio drivers via PortAudio. Required the use of advanced programming techniques in Haskell, and is optimized to achieve extremely low latency.

Programming Experience

- Expert C, C#, Java, Haskell
Advanced C++, Python, HTML/CSS, JavaScript

Hobbies / Languages

- Play both 6 and 7-string electric guitar.
Fluent in English and Spanish