Kavon Farvardin

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Research Interests

Parallel functional programming languages and their implementations; scalable concurrent data structures; automatic tuning of compilers.

Education

University of Chicago

Ph.D. in Computer Science — **2014 – present**

M.S. in Computer Science — **2018**

Pennsylvania State University

B.S. in Computer Science — **2009 – 2014**

B.S. in Mathematics

Experience

The Manticore Project — **Sep 2014 – present**

I developed a new LLVM backend for the compiler while investigating implementations of continuations. I also explored techniques for garbage collection to reduce thread communication overhead in the split-heap runtime system.

Microsoft Research

Research Intern — **Apr 2017 – June 2017**

Under the mentorship of Simon Peyton Jones, I worked on improving the interface between the Glasgow Haskell Compiler (GHC) and LLVM. Specifically, I added a new intrinsic to LLVM that can be used by many functional-language compilers, which typically manage the call stack themselves, to alleviate the process targeting LLVM effectively.

Penn State Applied Research Laboratory

Research Staff — **May 2014 – Aug 2014**

Distinguished Undergrad Researcher — **May 2012 – May 2013** ∪ **Jan 2014 – May 2014**

Lead developer researching new features for an immersive 3D data visualization program.

Intel Corporation

Software Engineering Intern — **June 2013 – Dec 2013**

Worked with a team developing a DSL and compiler based on LLVM for hardware validation. My primary task was to develop hardware tests according to a specification, analyze the compiler's output, and run tests on known-good CPUs to identify compiler bugs.

Pennsylvania State University
Undergraduate Researcher **Aug 2009 – Aug 2011**
Built educational software, for pedagogical research with a professor, that employs an interactive, graphical tracing method to teach fundamentals of programming.

TEACHING

Artifice
Chief Technical Officer, Curriculum Director **Sep 2016 – present**
After-school Instructor **Sep 2015 – Sep 2016**
Artifice is a non-profit, volunteer-run organization in Chicago that teaches youths valuable STEM skills. We run after-school classes for 4th–6th graders that provides a fun, hands-on experience with electronics and Arduino programming. As CTO, I led the switch to a visual language (Scratch) for Adriuno programming in the after-school classes.

Compilers — MPCS 51300
Teaching Assistant UChicago, **Autumn 2017**

Computer Science with Applications 1 — CMSC 12100
Teaching Assistant UChicago, **Autumn 2017**

Computer Science with Applications 2 — CMSC 12200
Teaching Assistant UChicago, **Winter 2017**

Compilers for Computer Languages — CMSC 22600
Teaching Assistant UChicago, **Autumn 2016**

Functional Programming — CMSC 22300
Teaching Assistant UChicago, **Winter 2016**

Computer Science with Applications 1 — CMSC 12100
Teaching Assistant UChicago, **Autumn 2015**

Concurrent Scientific Programming — CMPSC 451
Teaching Assistant Penn State, **Spring 2014**

Programming Language Concepts — CMPSC 461
Teaching Intern Penn State, **Spring 2013**
Prepared and delivered the class's lectures on compilers, context-free and regular languages, memory management, garbage collection, and Prolog.

Introduction to Programming Techniques — CMPSC 121
Teaching Intern Penn State, **Fall 2012**
Prepared and delivered the class's lectures on Boolean algebra, sorting and searching algorithms, and basic data structures.

PAPERS

Weighing Continuations for Concurrency **Mar 2017**
Kavon Farvardin
Master's Thesis

Compiling with Continuations and LLVM **Sep 2016**
Kavon Farvardin and John Reppy
ML Workshop

Spread-Spectrum Organization for Concurrent Pools **Feb 2016**
Kavon Farvardin and John Reppy
Unpublished

TALKS

Native Support for Explicit Stacks in LLVM **Sep 2017**
Haskell Implementors' Workshop

Practical Conversion from CPS to Direct Style **Dec 2016**
Midwest PL Summit

LANGUAGE FAMILIARITY

Assembly, C, C++, Haskell, Java, LLVM, Prolog, Python, Scheme, Standard ML, *etc.*