

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

M.S. in Computer Science

2014 – present

2018



Pennsylvania State University

B.S. in Computer Science

B.S. in Mathematics

2009 – 2014



EXPERIENCE

The Manticore Project

Sep 2014 – present

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



Argonne National Laboratory

Research Aide

June 2018 – Aug 2018

Under the mentorship of Hal Finkel, I started the atJIT project, which is an LLVM-powered system that provides the ability to automatically performance-tune annotated C++ programs during execution through the use of machine learning and other optimization techniques.



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.

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

atJIT: an online, feedback-directed optimizer for C++

Oct 2018

LLVM Developers' Meeting

Comparing strategies for lightweight threading based on continuations

Sep 2018

Workshop on Functional High-Performance Computing

Native Support for Explicit Stacks in LLVM

Sep 2017

Haskell Implementors' Workshop

Practical Conversion from CPS to Direct Style

Dec 2016

Midwest PL Summit

TEACHING

Artifice

Chief Technical Officer

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 Arduino programming in the after-school classes.

Computer Science with Applications 2 — CAPP 30122

Teaching Assistant

UChicago, **Winter 2019**

Compilers — MPCS 51300

Teaching Assistant

UChicago, **Autumn 2018**

Compilers — MPCS 51300

Teaching Assistant

UChicago, **Winter 2018**

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.

LANGUAGE
FAMILIARITY

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