Pierce Darragh

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pdarragh.github.io

My research focuses on the design of programming language features that improve the ability of developers to translate their thoughts into code. I am particularly interested in advanced ergonomic static analyses.

Education

In-Progress	**University of Maryland** PhD in Computer Science. Advised by David Van Horn.
2018	**University of Utah** MS in Computer Science. BS in Computer Science, Minor in Linguistics.

Research

Publications

BRM 2021 — **SweetPea: A standard language for factorial experimental design.**

Authors:	Sebastian Musslick, Anastasia Cherkaev, Ben Draut, Ahsan Sajjad Butt, <u>Pierce Darragh</u>, Vivek Srikumar, Matthew Flatt, Jonathan D Cohen.
Date:	April 2021.
Venue:	Behavior Research Methods, volume 54, issue 2.
URL:	pdarragh.github.io/p/sweetpea

Scheme 2020 — **Clotho: A Racket Library for Parametric Randomness.**

Authors:	<u>Pierce Darragh</u>, William Hatch, and Eric Eide.
Date:	August 2020.
Venue:	Scheme and Functional Programming Workshop 2020.
URL:	pdarragh.github.io/p/scheme20

ICFP 2020 — **Parsing with Zippers (Functional Pearl).**

Authors:	<u>Pierce Darragh</u> and Michael D. Adams.
Date:	August 2020.
Venue:	PACMPL, volume 4, issue ICFP.
URL:	pdarragh.github.io/p/icfp20

Presentations

RacketCon 2020	**Clotho: A Racket Library for Parametric Randomness.**
Scheme 2020	**Clotho: A Racket Library for Parametric Randomness.**
ICFP 2020	**Parsing with Zippers (Functional Pearl).**

| In-Progress | **a86 Assembly Interpreter** github.com/cmsc430/a86-interpreter |
| | UMD uses a restricted subset of the x86-64 assembly language (called a86) for their undergraduate compilers course, which is implemented in Racket. I am implementing a step-able interpreter with helpful feedback to improve the student debugging experience. |

| 2020–2021 | **SweetPea** sweetpea-org.github.io |
| | A domain-specific language built for the declarative specification of randomized experimental designs. I rewrote the back-end processing system and revised the front-end API. |

| 2019–2020 | **Xsmith** www.flux.utah.edu/project/xsmith |
| | A generic fuzzer generator, built in the spirit of Csmith but implemented as a domain-specific language in Racket. I implemented the Python fuzzer specification and its necessary internal components, and also developed a new Racket library (named Clotho) to improve Xsmith's capabilities for exploring state spaces. |

Teaching

| Spring 2022 | **CMSC 388X: Introduction to Programming Language Theory** |
| | I developed a new undergraduate course with a labmate. Select topics included: |

- Syntactic theory (e.g., BNF grammars, metafunctions).
- Structural induction over syntax for proofs.
- Reduction and typing relations via small-step operational semantics.
- The lambda calculus.
- Extending the lambda calculus with types and recursion.

Students also formed small groups, and each group selected one paper from a pre-approved list to read and present for discussion with the class.

Spring 2023	**Compilers** — CMSC 430
Fall 2022	**Compilers** — CMSC 430
Spring 2022	**Advanced Functional Programming** — CMSC 488B
Fall 2021	**Programming Languages** — CMSC 330

Academic Service

| 2019–2021 | Organizer, programming languages reading group, University of Utah. |
| 2013 & 2014 | Volunteer judge, Salt Lake Valley Science and Engineering Fair. |

Awards

2021–Present	Dean's Fellowship, University of Maryland.
2012–2016	National Merit Scholarship, sponsored by E∗TRADE.
2012	Merit Scholarship with Presidential Honors, University of Utah.

Industry Experience

Summer 2017	**Apple, Inc.**, Software Engineer Intern
	Designed, built, and presented a secure framework for automatically creating proxy servers intended for use in internal penetration testing.

Non-Academic Service and Leadership

2020–Present	Moderator, /r/ProgrammingLanguages Discord server.
2020–2021	Community manager, Jean Yang's `#PLTalk` Twitch stream and Discord server.
2014–2017	Web administrator, University of Utah Club Swim Team.
2014–2015	Men's team captain, University of Utah Club Swim Team.