

# Nathan Taylor

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## Experience

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### 2021-???? The University of Texas

Austin, TX

PhD student and Graduate Research Assistant | Supervisor: [James Bornholt](#)

Pondered the intersection of formal methods and computer systems. Organized the [Systems+PL](#) reading group and mentored students attending the undergraduate systems [directed reading program](#). Contributed to the [SquirrelFS](#) Rust persistent memory filesystem.

### 2020-2020 Microsoft Research

New York, NY (remote)

Contract Software Developer

Contributed to *Shapeshifter* with the [AI for Systems](#) lab, which leverages machine learning and dynamic analysis to optimize datastore index structure. Through careful design and profiling, reduced the critical-path policy engine's latency by nearly 40%. Built the interactive [visualizer and frontend](#) as part of a [TechFest](#) demo for senior leadership. Mentored interns new to the project, one of whom reported that "this is the highest-quality research codebase I've ever seen".

### 2018-2019 Apple

Cupertino, CA

Systems Software Engineer

[Brought the rainbow to you](#) by bridging the gap between hardware and software, influencing performance improvements, power efficiency, security, and the programming ease of hitherto-unreleased Apple products.

### 2017-2018 Fauna

San Francisco, CA

Senior Software Engineer

Developed Fauna's core product, its [globally consistent, transactional database](#). Co-designed and implemented a distributed fault injection testbed which caught database consistency bugs before they could hit production. Mentored engineers new to Scala, JVM concurrency, and the strongly-typed functional programming style. Disseminated technical knowledge via the [official company blog](#).

### 2014-2017 Fastly

San Francisco, CA

Senior Software Engineer

Maintained Fastly's core product, an [HTTP reverse proxy and cache](#) during which network throughput increased sixfold to [4.5 million RPS](#). Extended Fastly's [edge-compute programming language](#). Led the design and implementation of a sandboxing dynamic analysis and system introspection runtime, atop which the compiler, API, and security teams have built custom tooling. Represented Fastly externally by [speaking](#) at [conferences](#).

### 2012-2014 Twitter

San Francisco, CA

Software Engineer II

Extended Twitter's Ruby and Java runtimes as part of the [Runtime Systems org](#), improving garbage collection, JIT compilation, and runtime tooling and infrastructure. Collaborated with service owners to debug GC and application-level performance issues in their production systems; in one case, careful GC and data structure tuning increased throughput by two orders of magnitude. Revamped legacy systems as part of the [Anti-Spam Engineering Teams](#), reducing end-to-end latency in key services by an order of magnitude, and designed and implemented new services for spam reporting and actioning.

## Teaching Experience

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For further details about my teaching experience and philosophy, please see [my homepage](#).

### 2020-2021 MacEwan University

Edmonton, AB, Canada

Sessional Instructor

### 2020-2020 The University of Toronto

Toronto, ON, Canada (remote)

Sessional Instructor

## Education

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2009-2012 **The University of British Columbia**

Vancouver, BC, Canada

Msc, Computer Science | Supervisor: [Andy Warfield](#)

As a TA for UBC's brand-new [Scheme-based introductory CS course](#), I was awarded a [graduate TA award](#) by the University (a [gold star!](#)).

As President of the [CS Graduate Students' Association](#), I liaised between graduate students and the department, led TA training sessions, organized [social activities](#), and served on the [UBC Graduate Council](#). Organized the [systems](#) and [security](#) reading seminars.

2005-2009 **The University of Alberta**

Edmonton, AB, Canada

Bsc, Computing Science

As a [Undergraduate Association of Computing Science](#) executive, I interfaced with groups outside the department and advocated for undergraduates' issues within. As a member of the U of A's [Cluster Challenge Team](#), I configured, benchmarked, and tuned the GAMESS quantum chemistry package, and served as a physical chemistry domain expert for the team. I also assisted with stereographic visualization of molecular data and general cluster system administration.

## Publications and Presentations

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07.2024	<b>SquirrelFS: Using the Rust Compiler to Check Filesystem Crash Consistency</b>	OSDI '24   <a href="#">PDF</a>   <a href="#">Source</a>
01.2020	<b>ELF off the Shelf</b>	Unix-focused guest lecture in <a href="#">Macewan University's OS class</a>   <a href="#">Slides</a>
11.2017	<b>Cache Ruins Everything Around Me!</b>	Guest lecture in <a href="#">Macewan University's OS class</a>   <a href="#">Slides</a>
07.2017	<b>Let's Build A HyperCard RPG!</b>	Coding Livestream   <a href="#">Videos</a>
11.2016	<b>Hands-on HTTP/2, a Fresh Start to The Web</b>	QCon SF 2016   <a href="#">Event Page</a>
06.2016	<b>Beyond Breakpoints: A Tour Of Dynamic Analysis</b>	QCon NYC 2016   <a href="#">Video</a>   <a href="#">Materials</a>
12.2015	<b>Two Approaches towards OS Scalability</b>	Papers We Love SF 12/2015   <a href="#">Video</a>   <a href="#">Event Page</a>
09.2015	<b>Racing to Win: Correct Concurrency with Race Conditions</b>	Surge 2015   <a href="#">Video</a>   <a href="#">Materials</a>
04.2015	<b>Your Computer Is Already A Distributed System; Why Isn't Your OS?</b>	Papers We Love SF 04/2015   <a href="#">Video</a>   <a href="#">Event Page</a>
06.2014	<b>Your Heap And You: Garbage Collector Tuning for Twitter Services</b>	Internal tech talk
05.2013	<b>Cachekata: Memory Hierarchy Optimization via Dynamic Binary Translation</b>	Msc. Thesis   <a href="#">PDF</a>
04.2013	<b>Whose Cacheline is it Anyway: Operating System Support for Live Detection &amp; Repair of False Sharing</b>	Eurosys '13   <a href="#">PDF</a>
03.2012	<b>Debugging Through Time with the Tralfamadore Debugger</b>	RESolve '12   <a href="#">PDF</a>
08.2011	<b>Herbert West: Deanonymizer</b>	HotSec'11   <a href="#">PDF</a>
10.2010	<b>Iodine: Interactive Program Partitioning</b>	OSDI '10 Poster Session   <a href="#">PDF</a>