Nathan Taylor

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Experience

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

Designed and implemented *Shapeshifter* with the AI for Systems lab, which leverages machine learning and dynamic analysis to optimize datastore index structure. Contributed to high-level system design, core implementation, and performance analysis. Built an interactive visualizer and frontend to the system as part of a TechFest demo for senior leadership.

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 system to validate correctness under chaotic scenarios, such as network failures and database sharding changes. 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 traffic 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 VM tooling and infrastructure. Collaborated with service owners to debug GC and application-level performance issues in production systems. Revamped and replaced legacy spam and abuse systems as part of the Anti-Spam Engineering Team, and designed and implemented services for user spam reporting and actioning.

Teaching Experience

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

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 liased 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

07.2024 **SquirrelFS: Using the Rust Compiler to Check Filesystem Crash Consistency** | OSDI '24 | PDF | Source

01.2020 **ELF off the Shelf** | Unix-focused guest lecture in Macewan University's OS class | Slides

11.2017 **Cache Ruins Everything Around Me!** | Guest lecture in Macewan University's OS class | Slides

07.2017 **Let's Build A HyperCard RPG!** | Coding Livestream | Videos

11.2016 **Hands-on HTTP/2, a Fresh Start to The Web** | QCon SF 2016 | Event Page

06.2016 **Beyond Breakpoints: A Tour Of Dynamic Analysis** | QCon NYC 2016 | Video | Materials

12.2015 **Two Approaches towards OS Scalability** | Papers We Love SF 12/2015 | Video | Event Page

09.2015 **Racing to Win: Correct Concurrency with Race Conditions** | Surge 2015 | Video | Materials

04.2015 **Your Computer Is Already A Distributed System; Why Isn't Your OS?** | Papers We Love SF 04/2015 | Video | Event Page

06.2014 **Your Heap And You: Garbage Collector Tuning for Twitter Services** | Internal tech talk

05.2013 **Cachekata: Memory Hierarchy Optimization via Dynamic Binary Translation** | Msc. Thesis | PDF

04.2013 **Whose Cacheline is it Anyway: Operating System Support for Live Detection & Repair of False Sharing** | Eurosys '13 | PDF

03.2012 **Debugging Through Time with the Tralfamadore Debugger** | RESolVE '12 | PDF

08.2011 **Herbert West: Deanonymizer** | HotSec'11 | PDF

10.2010 **Iodine: Interactive Program Partitioning** | OSDI '10 Poster Session | PDF