

## RESEARCH INTERESTS

Programming Languages and Formal Methods; Static analysis, particularly type systems and program verification, applied to concurrent and systems software

## EDUCATION

**University of Washington**, September 2009 — Present, Expected 2014, Pursuing Ph.D. Computer Science  
Advisors: Michael D. Ernst and Dan Grossman

**University of Washington**, September 2009 — June 2011, M.S. Computer Science  
Project: Static Lock Capabilities for Deadlock Freedom  
Advisors: Michael D. Ernst and Dan Grossman

**Brown University** 2004 — 2008, Sc.B. Computer Science  
Honors Thesis: Type-Safe Stack Inspection for Garbage Collector Implementation  
Honors Advisor: Shriram Krishnamurthi

## HONORS

Computing Research Association (CRA) Outstanding Undergraduate Award Honorable Mention 2008  
Brown University: Honors in Computer Science, Computer Science Senior Prize with Distinction 2008

## REFEREED PUBLICATIONS

GORDON, C. S., ERNST, M. D., AND GROSSMAN, D. Static Lock Capabilities for Deadlock Freedom. In *Workshop on Types in Language Design and Implementation* (Philadelphia, PA, USA, January 2012)

GORDON, C. S. Formal Semantics for Testing. In *Off the Beaten Track Workshop* (Philadelphia, PA, USA, January 2012)

GORDON, C., MEYEROVICH, L., WEINBERGER, J., AND KRISHNAMURTHI, S. Composition with Consistent Updates for Abstract State Machines. In *Proceedings of the 14th International Workshop on Abstract State Machines (ASM'07)* (Grimstad, Norway, June 2007)

## THESES AND TECHNICAL REPORTS

GORDON, C. S., ERNST, M. D., AND GROSSMAN, D. Static Lock Capabilities for Deadlock Freedom. Tech. Rep. UW-CSE-11-10-01, Computer Science and Engineering, University of Washington, Seattle, WA, USA, 2011

GORDON, C. S. Type-Safe Stack Traversal for Garbage Collector Implementation. Brown University Senior Honors Thesis, May 2008. Undergraduate Thesis

MEYEROVICH, L. A., WEINBERGER, J. H. W., GORDON, C. S., AND KRISHNAMURTHI, S. ASM Relational Transducer Security Policies. Tech. Rep. CS-06-12, Computer Science Department, Brown University, Providence, RI, USA, 2006  
*Early version of the ASM'07 paper.*

## PATENTS

GORDON, C. S., SINGH, P. V., AND TRIMMER, D. A. Merging containers in a multi-container system. Patent, November 2010. US Patent Number 7828201. Filed April, 2007. Assigned to Network Appliance, Inc

GORDON, C. S., SINGH, P. V., AND TRIMMER, D. A. Data containerization for reducing unused space in a file system. Patent, June 2010. US Patent Number 7739312. Filed April, 2007. Assigned to Network Appliance, Inc

## RESEARCH

**Type and Effect System for Preventing GUI Threading Errors** (Feb. 2012–Present)  
Working on a polymorphic type and effect system to statically disallow accessing UI elements from threads other than the main UI thread, which is a common error in programs with graphical user interfaces. With Sai Zhang, Werner M. Dietl, and Michael Ernst.

**Dynamic Contracts for Concurrent Code** (Nov. 2012–Present)  
Designing a dynamic contract system for shared memory concurrent code, ensuring that contracts function correctly in a concurrent setting and account for not only interference by other threads but also communication with other threads. With Todd Schiller, Michael Ernst, and Dan Grossman.

**Type System for Safe Parallelism via Reference Immutability** (Summer 2012–Present)  
Working on formalizing the first type system using temporary reference immutability for safe parallelism. Includes novel combinations of uniqueness, object immutability, and reference immutability. With Matt Parkinson.

**Type System for Deadlock Freedom** (Oct. 2009–Present)  
Working on formalizing a type system for deadlock freedom in shared-memory multithreaded programs, using a more flexible model for lock ordering than previous deadlock-freedom type systems. With Michael Ernst and Dan Grossman.

**Type-Safe Garbage Collection** (Sept. 2007–May 2008)  
Modified an ML compiler to emit source-level representations of hardware stack frames to use in conjunction with region types to implement a type-safe stack traversal and allocation-safe garbage collector. Resulted in *Type-Safe Stack Inspection for Garbage Collector Implementation*. Honors thesis supervised by Shriram Krishnamurthi

**Type System to Check Linearizability of Lock-Free Data Structures** (Feb.–May 2008)  
Work towards a type system strong enough to check linearizability for a broad class of lock-free algorithms that used common patterns. With another student and Shriram Krishnamurthi.

**Reducing Power Consumption with Hardware Transactional Memory** (Sept. 2007–May 2008)  
Prototyping alternative cache architectures for hardware implementations of transactional memory, with the goal of reducing power consumption in embedded devices. With other students, Maurice Herlihy, and Iris Bahar.

**Dynamic Contention Management for Software Transactional Memory** (Jan. 2007–May 2007)  
Explored feasibility of dynamically switching contention management policies at runtime based on recent application performance. With Maurice Herlihy and Thomas W. Doepfner.

**Modeling and Verifying Web Applications** (Feb.–May 2006)  
Modeled a dynamic access control system for the Continue Conference Manager, and developed a composition operator for Abstract State Machine (ASM) specifications that preserved atomicity of the components' updates. Resulted in *ASM Relational Transducer Security Policies* and *Composition with Consistent Updates for Abstract State Machines*. With Leo Meyerovich, Joel Weinberger, and Shriram Krishnamurthi.

## SERVICE

**Subreviewer:** ICSE 2001, OOPSLA 2011

**PC Member:** RACS 2011

## INDUSTRY EXPERIENCE

**Microsoft, Technical Strategy Incubation SDE Intern** (June 2011 - September 2011)  
Worked on language design and implementation for integrating contracts into a C#-like language.

**Microsoft, Technical Strategy Incubation SDE (Fulltime)** (August 2008 - September 2009)  
Worked as a kernel developer on an unannounced systems project. Worked on a range of tasks, from hardware abstractions to interrupt delivery via scheduler activations, from whole-system post-mortem debugging to hypervisor integration.

**Sun Microsystems, Solaris Kernel Intern** (Summer 2007)  
Merged two processor grouping scheduler abstractions, handling separate implementations of the original subsystems, and backwards compatibility. Required substantial synchronization work and changes to process and thread creation and termination, boot code, and other areas.

**Network Appliance, Data Retention Group Member of Technical Staff (Intern)** (Summer 2006)  
Designed and implemented a special-purpose filesystem designed to run efficiently on top of Network Appliance's WAFL filesystem and offering recovery to a consistent state in the event of a crash. Resulted in a patent.

## TEACHING ASSISTANTSHIPS

**University of Washington:** Graduate (Master's program) Operating Systems, Introduction to Systems Programming (Grad TA)

**Brown University:** Introduction to Scientific Computing, Integrated Introduction to Computer Science I & II (twice each, once as one of two Head TAs), Operating Systems (one of two Head TAs), Software Systems Design (Head TA)

## SELECTED GRADUATE LEVEL COURSEWORK

**University of Washington:** Concepts of Programming Languages (Dan Grossman), Software Engineering: Program Analysis (Michael Ernst), Advanced Software Engineering: Program Analysis for Software Security (Ben Livshits)

**Brown University:** Specification and Verification of Dynamic Access Control (Shriram Krishnamurthi), Optimistic Replication (Shriram Krishnamurthi)

## TECHNICAL SKILLS

Known Languages: C/C++/C#, Java

Familiar with: Coq, x86/amd64 and ARM assembly, Racket (formerly PLT Scheme), Haskell, OCaml

## OTHER INTERESTS

Literature, Cooking, Bass Guitar