

RESEARCH INTERESTS

Programming languages and formal methods; type systems and program verification for low-level, concurrent, and distributed systems

EDUCATION

University of Washington, September 2009 – August 2014, Ph.D. Computer Science

Dissertation Title: Verifying Concurrent Programs by Controlling Alias Interference

Advisors: Michael D. Ernst and Dan Grossman

Additional Committee Member: Matthew J. Parkinson (MSR Cambridge)

University of Washington, September 2009 — June 2011, M.S. Computer Science

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

Additional Readers: Maurice Herlihy, Thomas W. Doepfner

FUNDING

Title: CAREER:Modal Abstractions of Systems Concepts for OS Kernel Verification

Source: NSF CAREER

Amount: \$579,853

Period: 09/01/2019–08/31/2024

Role: PI (100%)

JOURNAL PUBLICATIONS

Colin S. Gordon, Michael D. Ernst, Dan Grossman, and Matthew J. Parkinson. Verifying Invariants of Lock-free Data Structures with Rely-Guarantee and Refinement Types. *ACM Transactions on Programming Languages and Systems (TOPLAS)*, 39(3), May 2017.

2016 Impact Factor (JCR): 3.033.

CONFERENCE PUBLICATIONS

Ismail Kuru and Colin S. Gordon. A Type System for Read-Copy-Update Concurrency. In *European Symposium on Programming (ESOP 2019)*, Prague, Czech Republic, April 2019. Acceptance Rate TBD% (28/TBD). To appear.

Colin S. Gordon. A Generic Approach to Flow-Sensitive Polymorphic Effects. In *Proceedings of the 31st European Conference on Object-Oriented Programming (ECOOP'17)*, Barcelona, Spain, June 2017. Acceptance Rate 33.3% (27/81).

Satish Chandra, Colin S. Gordon, Jean-Baptiste Jeannin, Cole Schlesinger, Manu Sridharan, Frank Tip, and Young-Il Choi. Type Inference for Static Compilation of JavaScript. In *Proceedings of the 2016 ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA 2016)*, Amsterdam, The Netherlands, November 2016. Acceptance Rate 25.6% (52/203)

Esben Andreasen, Colin S. Gordon, Satish Chandra, Manu Sridharan, Frank Tip, and Koushik Sen. Trace Typing An Approach for Evaluating Retrofitted Type Systems. In *Proceedings of the 30th European Conference on Object-Oriented Programming (ECOOP'16)*, Rome, Italy, July 2016. Acceptance Rate 31.6% (25/79)

Colin S. Gordon, Werner Dietl, Michael D. Ernst, and Dan Grossman. JavaUI: Effects for Controlling UI Object Access. In *Proceedings of the 27th European Conference on Object-Oriented Programming (ECOOP'13)*, Montpellier, France, July 2013. Acceptance Rate 25% (29/116)

Colin S. Gordon, Michael D. Ernst, and Dan Grossman. Rely-Guarantee References for Refinement Types Over Aliased Mutable Data. In *Proceedings of the 34th ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'13)*, Seattle, WA, USA, June 2013. Acceptance Rate 17% (46/267)

Colin S. Gordon, Matthew J. Parkinson, Jared Parsons, Aleks Bromfield, and Joe Duffy. Uniqueness and Reference Immutability for Safe Parallelism. In *Proceedings of the 2012 ACM International Conference on Object Oriented Programming, Systems, Languages, and Applications (OOPSLA'12)*, Tucson, AZ, USA, October 2012. Acceptance Rate 26% (59/228)

WORKSHOP PUBLICATIONS

Sergey Matskevich and Colin S. Gordon. Generating Comments from Source Code. In *ACM Workshop on Natural*

Language for Software Engineering (NL4SE), Lake Buena Vista, FL, USA, November 2018

Colin S. Gordon. Synthesizing Program-Specific Static Analyses. In *Off the Beaten Track Workshop (OBT'18)*, Los Angeles, CA, USA, January 2018. Position paper

Colin S. Gordon, Michael D. Ernst, and Dan Grossman. Static Lock Capabilities for Deadlock Freedom. In *Proceedings of the 8th ACM SIGPLAN Workshop on Types in Language Design and Implementation (TLDI'12)*, Philadelphia, PA, USA, January 2012

Colin S. Gordon. Formal Semantics for Testing. In *Off the Beaten Track Workshop (OBT'12)*, Philadelphia, PA, USA, January 2012. Position paper

Colin Gordon, Leo Meyerovich, Joel Weinberger, and Shriram Krishnamurthi. 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

DISSERTATIONS & THESES

Colin S. Gordon. *Verifying Concurrent Programs by Controlling Alias Interference*. PhD thesis, University of Washington, Seattle, WA, USA, August 2014

Colin Stebbins Gordon. Type-Safe Stack Traversal for Garbage Collector Implementation. Brown University Senior Honors Thesis, May 2008. Undergraduate Thesis

TECHNICAL REPORTS

Colin S. Gordon. Sequential Effect Systems with Control Operators. Technical Report arXiv cs.PL 1811.12285, Computing Research Repository (CoRR), December 2018. Under review

Ismail Kuru and Colin S. Gordon. A Type System for Read-Copy-Update Concurrency. Technical Report arXiv cs.PL 1811.11853, Computing Research Repository (CoRR), December 2018

Colin S. Gordon. Polymorphic Iterable Sequential Effect Systems. Technical Report arXiv cs.PL/cs.LO 1808.02010, Computing Research Repository (CoRR), August 2018. Extended version of ECOOP 2017 paper, under review for *Logical Methods in Computer Science*

Colin S. Gordon. A Generic Approach to Flow-Sensitive Polymorphic Effects (Extended Version). Technical Report arXiv cs.PL 1705.02264, Computing Research Repository (CoRR), May 2017

Satish Chandra, Colin S. Gordon, Jean-Baptiste Jeannin, Cole Schlesinger, Manu Sridharan, Frank Tip, and Young-II Choi. Type Inference for Static Compilation of JavaScript (Extended Version). Technical Report arXiv cs.PL 1608.07261, Computing Research Repository (CoRR), August 2016

Esben Andreasen, Colin S. Gordon, Satish Chandra, Manu Sridharan, Frank Tip, and Koushik Sen. Trace Typing An Approach for Evaluating Retrofitted Type Systems (Extended Version). Technical Report SRA-CSIC-2016-001, Samsung Research America, May 2016. Also available from Computing Research Repository (CoRR), arXiv cs.PL 1605.01362

Colin S. Gordon, Werner Dietl, Michael D. Ernst, and Dan Grossman. JavaUI: Effects for Controlling UI Object Access (Extended Version). Technical Report UW-CSE-13-04-01, University of Washington, April 2013

Colin S. Gordon, Michael D. Ernst, and Dan Grossman. Rely-Guarantee References for Refinement Types Over Aliased Mutable Data (Extended Version). Technical Report UW-CSE-13-03-02, University of Washington, March 2013

Colin S. Gordon, Matthew J. Parkinson, Jared Parsons, Aleks Bromfield, and Joe Duffy. Uniqueness and Reference Immutability for Safe Parallelism (Extended Version). Technical Report MSR-TR-2012-79, Microsoft Research, October 2012

Colin S. Gordon, Michael D. Ernst, and Dan Grossman. Static Lock Capabilities for Deadlock Freedom. Technical Report UW-CSE-11-10-01, Computer Science and Engineering, University of Washington, Seattle, WA, USA, 2011

Leo A. Meyerovich, Joel H. W. Weinberger, Colin S. Gordon, and Shriram Krishnamurthi. ASM Relational Transducer Security Policies. Technical Report CS-06-12, Computer Science Department, Brown University, Providence, RI, USA, 2006

PATENTS

John J. Duffy, Jared Porter Parsons, Colin Stebbins Gordon, Alexander Daniel Bromfield, Martin Taillefer, David Allen Bartolomeo, and Michael Barnett. Operating system support for contracts. Patent, March 2016. US Patent Number

9286039. Filed March 14, 2013. Assigned to Microsoft Corporation

Colin Stebbins Gordon, Pratap Vikram Singh, and Donald Alvin Trimmer. Merging containers in a multi-container system. Patent, November 2010. US Patent Number 7828201. Filed April, 2007. Assigned to Network Appliance, Inc.

Colin Stebbins Gordon, Pratap Vikram Singh, and Donald Alvin Trimmer. 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.

PANELS

Object Capability Languages, Systems, and Applications (OCAP) 2018: *Formal Methods Panel*, Boston, MA, USA, 11/6/2018

INVITED TALKS

Clemson/Ohio State RESOLVE Research Group Meeting: *Designing with Static Capabilities and Effects*, Online, 1/23/19

Object Capability Languages, Systems, and Applications (OCAP) 2018: *Designing with Static Capabilities and Effects*, Boston, MA, USA, 11/6/2018

Concurrency Yak at POPL'14: *Temporal Specifications for Clients*, San Diego, CA, USA, 1/21/14

Languages for the Multicore Era 2013 (LaME'13): *Open Questions in Mutation Control (Invited talk)*, Montpellier, France, 7/1/13

Oracle Java Tech Talk: *JavaUI: Effects for Controlling UI Object Access*, Video Conference to Santa Clara, CA, 3/14/13

Microsoft Research Redmond, RiSE All-Hands: *Uniqueness and Reference Immutability for Safe Parallelism*, Redmond, WA, USA, 10/5/12

CONFERENCE AND WORKSHOP PRESENTATIONS

OBT'18: *Synthesizing Program-Specific Static Analyses*, Los Angeles, CA, USA, 1/13/18

ECOOP'17: *A Generic Approach to Flow-Sensitive Polymorphic Effects*, Barcelona, Spain, 6/23/17

PLDI'17: *Verifying Invariants of Lock-Free Data Structures with Rely-Guarantee and Refinement Types*, Barcelona, Spain, 6/20/17

ECOOP'13: *JavaUI: Effects for Controlling UI Object Access*, Montpellier, France, 7/3/13

PLDI'13: *Rely-Guarantee References for Refinement Types over Aliased Mutable Data*, Seattle, WA, USA, 6/17/13

OOPSLA'12: *Uniqueness and Reference Immutability for Safe Parallelism*, Tucson, AZ, USA, 10/23/12

OBT'12: *Formal Semantics for Testing*, Philadelphia, PA, USA, 1/28/12

TLDI'12: *Static Lock Capabilities for Deadlock Freedom*, Philadelphia, PA, USA, 1/28/12

HONORS & AWARDS

ACM Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA) Distinguished Reviewer Award 2018

Drexel University Senate Committee on Academic Affairs Letter of Recognition 2018

Computing Research Association (CRA) Outstanding Undergraduate Award Honorable Mention 2008

Brown University: Honors in Computer Science, Computer Science Senior Prize with Distinction 2008

SERVICE

ACM SIGPLAN Symposium on Principles of Programming Languages (POPL)

Program Committee Member, 2020

ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA)

Artifact Evaluation Co-Chair, 2019

Program Committee Member & Session Chair, 2018

Doctoral Symposium Academic Panel Member, 2018

AITO European Conference on Object-Oriented Programming (ECOOP)

Program Committee Member & Session Chair, 2017

Doctoral Symposium Academic Panel Member, 2017

External Review Committee Member & Session Chair, 2016

ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)

External Review Committee Member, 2016

ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software

Engineering (ESEC/FSE), Tool Track

Program Committee Member, 2019

ACM SIGSOFT Conference on Automated Software Engineering (ASE), Tool Track

Program Committee Member, 2016

ACM SIGCSE Technical Symposium (SIGCSE)

Program Committee Member, Experience Reports and Tools Papers Track, 2019

Program Committee Member, Nifty Assignments Track, 2019

Journal Reviewing

Science of Computer Programming (Elsevier SCP), 2018–

Theoretical Computer Science (Elsevier TCS), 2017–

International Workshop on Aliasing, Capabilities, and Ownership (IWACO)

Program Committee Member, 2017

Program Committee Member, 2016

Program Committee Member, 2014

Other Conference Referee/Reviewer Roles

ACM SIGSOFT Conference on the Foundations of Software Engineering (FSE), 2016

Mathematical Foundations of Computer Science (MFCS), 2015

Computer Aided Verification (CAV), 2015

ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), 2014

ACM SIGPLAN Conference on Principles of Programming Languages (POPL), 2014

ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), 2013

ACM SIGSOFT Conference on the Foundations of Software Engineering (FSE), 2013

ACM SIGSOFT International Conference on Software Engineering (ICSE), 2011

ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), 2011

PROFESSIONAL SOCIETIES

Association for Computing Machinery (ACM)

ACM Professional Member (Member since 2008)

ACM SIGPLAN (Special Interest Group on Programming Languages) Member

ACM SIGLOG (Special Interest Group on Logic) Member

ACM SIGACT (Special Interest Group on Algorithms and Computation Theory) Member

Association for Automated Reasoning (AAR)

Member since 2016

Dr. Colin S. Gordon

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EXPERIENCE

- Drexel University**, *Assistant Professor* (September 2015 – Present)
- Samsung Research America**, *Frontier Computer Science Lab, Senior Research Engineer* (August 2014 – August 2015)
- Microsoft**, *Midori / Technical Strategy Incubation SDE Intern* (June 2011 - September 2011)
- Microsoft**, *Midori / Technical Strategy Incubation SDE (Fulltime)* (August 2008 - September 2009)
- Sun Microsystems**, *Solaris Kernel Intern* (Summer 2007)
- Network Appliance**, *Data Retention Group Member of Technical Staff (Intern)* (Summer 2006)