

# Joel Galenson

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## CONTACT INFORMATION

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<http://jgalenson.github.io/>

## RESEARCH INTERESTS

Systems security, return-oriented programming, exploit development, malware detection  
Program synthesis, static and dynamic analysis, testing, compilers, language design

## EDUCATION

**University of California, Berkeley** 2014  
Ph.D.  
Advisors: Rastislav Bodik and Koushik Sen

**Stanford University** 2008  
B.S. (honors, distinction)

## COMPUTER SKILLS

C, C++, Java, Scala, OCaml, C#, Python, JavaScript, ARM, L<sup>A</sup>T<sub>E</sub>X, HTML  
Linux, Android, return-oriented programming, gdb

## EXPERIENCE

**Software Engineer**, Google Spring 2017 - Present

I am on the Android Platform Security team, where I have worked on multiple projects to improve the security and privacy of billions of Android devices.

- I proposed, co-designed, and implemented one of Android's premier (upcoming) privacy features.
- I have made numerous optimizations to the upstream LLVM compiler to improve the performance of components such as its integer overflow sanitizer and undefined behavior sanitizer. This work was crucial in allowing us to enable these features on production devices.
- I am one of the maintainers of Android's SELinux system, which uses mandatory access controls to improve the security of the system. I have worked on improving Android's core policy and on bringing up multiple new devices.

**Senior Engineer**, Qualcomm Research Silicon Valley Fall 2014 - Spring 2017

- I researched behavioral mobile security solutions to protect against malware and exploits. I have spent much of my time developing attacks on Android, including building real exploits that bypass SELinux and target Chrome and the Stagefright and Dirtycow bugs. I have handwritten ARM assembly and built a simple shellcode and ROP compiler to ease payload development. I developed and gave our lab a tutorial on memory error attacks and defenses, including building a sequence of ROP attacks from simple to complex.
- I worked on developing compilation techniques for programming special purpose accelerator architectures. Our compiler was based on LLVM, and I worked on the backend, including scheduling, software pipelining, optimizing individual instructions, co-designing new instructions, and numerous architecture-specific passes. I also worked on providing tools to understand and optimize the compiler output as well as improving our test infrastructure and tracking upstream development.

**Graduate Student Researcher**, University of California, Berkeley Fall 2008 - Summer 2014

I was a member of the Parallel Computing Laboratory (Par Lab) where I worked on program synthesis techniques to aid general-purpose programming. I built an Eclipse plugin that dynamically generated code snippets (along with a JavaScript port) and a graphical programming by demonstration tool.

**Teaching Assistant**, University of California, Berkeley Spring 2014  
Was a TA for CS 61B: Data Structures.

**Intern**, Microsoft Research Silicon Valley Summer 2011  
Worked on an architecture for modular cooperating compilers.

**Intern**, Microsoft Research Silicon Valley Summer 2010  
Worked on a new architecture for evaluating LINQ queries that encompasses DryadLINQ.

**Teaching Assistant**, University of California, Berkeley Fall 2009  
Was a TA for CS 164: Programming Languages and Compilers.

**Intern**, IBM T.J. Watson Research Center Summer 2009  
Worked on the constraint-based type system for the X10 language.

**Platform intern**, Mozilla Summer 2008  
Worked on a native code compiler for regular expressions.

**Section Leader for CS 106**, Stanford University Fall 2005 - Summer 2008  
Taught a section covering introductory programming topics, graded homework and exams, staffed a help desk.

**Researcher**, Stanford University Summer 2006 - Spring 2008

- Built a verifying compiler for Zohar Manna and Aaron Bradley.
- Worked on two static analysis tools for Zohar Manna.
- Investigated the properties of online ad auctions and bidder strategies with Tim Roughgarden.
- Developed methods to enable the use of remote computers to speed up data processing by a robot for Andrew Ng.
- Developed techniques for visualizing personal information spaces for Pat Hanrahan.

**Teaching Assistant**, Stanford University Winter 2008  
Was a TA for CS 156: Calculus of Computation.

**Resident Computer Consultant**, Stanford University Fall 2006 - Spring 2008  
Assisted undergraduates with personal computer problems and administered a dorm network.

## PUBLICATIONS

Joel Galenson, Cindy Rubio-González, Sarah Chasins, and Liang Gong. Research.js: Evaluating Research Tool Usability on the Web. In *Proceedings of the 5th Workshop on Evaluation and Usability of Programming Languages and Tools (PLATEAU 2014)*, Portland, Oregon, USA, 2014.

Joel Galenson. Dynamic and Interactive Synthesis of Code Snippets. Ph.D. Dissertation, 2014.

Joel Galenson, Philip Reames, Rastislav Bodik, Bjoern Hartmann, and Koushik Sen. CodeHint: Dynamic and Interactive Synthesis of Code Snippets. In *International Conference on Software Engineering (ICSE 2014)*, Hyderabad, India, 2014.

Mihai Budiu, Joel Galenson, and Gordon D. Plotkin. The Compiler Forest. In *Proceedings of the 22nd European conference on Programming Languages and Systems (ESOP 2013)*, Rome, Italy, 2013.

David Gay, Joel Galenson, Mayur Naik, and Kathy Yelick. Yada: Straightforward Parallel Pro-

gramming. In *Parallel Computing*, Elsevier, 2011.

Rastislav Bodik, Satish Chandra, Joel Galenson, Doug Kimmelman, Nicholas Tung, Shaon Barman, and Casey Rodarmor. Programming with Angelic Nondeterminism. In *Proceedings of the 37th Symposium on Principles of Programming Languages (POPL 2010)*, Madrid, Spain, 2010.

Jason Auerbach, Joel Galenson, and Mukund Sundararajan. An empirical analysis of return on investment maximization in sponsored search auctions. In *Proceedings of the Second International Workshop on Data Mining and Audience Intelligence for Advertising (ADKDD 2008)*, Las Vegas, Nevada, USA, 2008.