Joel Galenson

Contact Information

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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, LaTeX, HTML
Linux, Android, return-oriented programming, gdb

Experience

Senior Engineer, Qualcomm Research Silicon Valley Fall 2014 - Present

- 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.
- I am researching 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.

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 Programming. 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.

References

Available on request