Stefan Bucur

Software Engineer at Google Inc.
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Research Interests

Program analysis, operating systems, programming languages, compilers.

I am interested in scaling precise program analysis to real-world software systems. My graduate work focused on enabling effective symbolic execution on systems that are large, span layers of abstraction, and interact with their environments.

Education

Ecole Polytechnique Federale de Lausanne (EPFL) Sept. 2009 - July 2015
Ph.D. in Computer Science Lausanne, Switzerland

Dependable Systems Laboratory, under the direction of Prof. George Candea.
Thesis: *Improving Scalability of Symbolic Execution for Software with Complex Environment Interfaces*

"Politehnica" University of Bucharest Oct. 2004 - June 2009
Dipl. Eng. in Computer Science Bucharest, Romania

GPA: 10/10 (Valedictorian)
Thesis: *Automatic Code Formatting for Structured Languages*

Research and Work Experience

Google Inc. Sept. 2015 - Present
Software Engineer Mountain View, CA

I work on large-scale distributed symbolic execution for software security.

Ecole Polytechnique Federale de Lausanne (EPFL) Sept. 2009 - August 2015
Research Assistant Lausanne, Switzerland

I was a PhD student in the Dependable Systems lab, working with Prof. George Candea. Main projects:

- **Chef** is a platform for obtaining symbolic execution engines for interpreted languages, such as Python, Ruby, or JavaScript. Chef reuses the interpreter as an executable language specification, thus eliminating the need for writing the engine from scratch. http://dslab.epfl.ch/proj/chef/
- **Cloud9** is a parallel symbolic execution engine that scales on shared-nothing clusters of commodity hardware. Cloud9 features a symbolic POSIX environment model that enables it to target systems ranging from command line utilities to web services and distributed systems. http://cloud9.epfl.ch

Google Inc. Nov. 2011 - Feb. 2012
Software Engineering Intern Zurich, Switzerland

I worked on deploying the Cloud9 parallel symbolic execution engine within Google and scaling it to test parts of the Chromium open source browser.

Ecole Polytechnique Federale de Lausanne (EPFL) July 2009 - Sept. 2009
Student Intern Lausanne, Switzerland

I worked on an initial prototype of the Cloud9 parallel symbolic execution engine.

Adobe Systems March 2009 - June 2009
Student Intern Bucharest, Romania

I developed a reusable and extensible automated source code formatting system, capable of applying a consistent set of formatting rules to multiple programming languages sharing a similar structure. The prototype was an Eclipse / Adobe Flex Builder plug-in.

Google Summer of Code May 2008 - August 2008
Contract Work as Student Bucharest, Romania

I added support for loading and linking dynamic ELF modules for the Syslinux bootloader suite. My mentor was H. Peter Anvin, the author of the Syslinux project and a Linux kernel maintainer.

Refereed Publications

[ASPLOS'14] **Prototyping Symbolic Execution Engines for Interpreted Languages.** Stefan Bucur, Johannes Kinder, and George Candea. *Intl. Conf. on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, Salt Lake City, UT, March 2014

[APSYS'13] **Making Automated Testing of Cloud Applications an Integral Component of PaaS.** Stefan Bucur, Johannes Kinder, and George Candea. *Asia-Pacific Workshop on Systems (APSYS)*, Singapore, July 2013

[PLDI'12] **Efficient State Merging in Symbolic Execution.** Volodymyr Kuznetsov, Johannes Kinder, Stefan Bucur, and George Candea. *Conf. on Programming Language Design and Implementation (PLDI)*, Beijing, China, June 2012

[EuroSys'11] **Parallel Symbolic Execution for Automated Real-World Software Testing.** Stefan Bucur, Vlad Ureche, Cristian Zamfir, George Candea. *ACM SIGOPS/EuroSys European Conference on Computer Systems (EuroSys)*, Salzburg, Austria 2011.

[SOCC'10] **Automated Software Testing as a Service.** George Candea, Stefan Bucur, Cristian Zamfir. *ACM Symposium on Cloud Computing (SOCC)*, Indianapolis, IN, June 2010.

[ACM OSR 10/2009] **Cloud9: A Software Testing Service.** Liviu Ciortea, Cristian Zamfir, Stefan Bucur, Vitaly Chipounov, George Candea. *ACM Operating Systems Review, Vol. 43, No. 4*, December 2009. (Also in *Proceedings of the 3rd SOSP Workshop on Large Scale Distributed Systems and Middleware (LADIS)*, Big Sky, MT, October 2009)

Honors

Gold Prize in the Open Source Software World Challenge 2013
for the Cloud9 project

Google European Doctoral Fellowship in Software Dependability 2011

EPFL Doctoral Fellowship 2009

Valedictorian of the 2009 Class 2009
in "Politehnica" University of Bucharest

First Prize at the National IBM Romania Best Linux Application 2008
for the project Dynamic Loading of ELF Modules for SYSLINUX

Worldwide Finals of Windows Embedded Student Challenge 2006
for the project PiCoPS: Pipe Contamination Prevention System

Bronze Medal at the International Physics Olympiad, Pohang, South Korea 2004

Invited Talks and Conference Presentations

Prototyping Symbolic Execution Engines for Interpreted Languages March 2014
Intl. Conf. on Architectural Support for Programming Languages and Operating Systems (ASPLOS), Salt Lake City, UT

Parallel Symbolic Execution for Automated Real-world Software Testing June 2012
2nd EcoCloud Annual Event, Lausanne, Switzerland

Parallel and Selective Symbolic Execution June 2011
1st International SAT/SMT Solver Summer School, MIT, Cambridge, MA

Parallel Symbolic Execution for Automated Real-World Software Testing April 2011
6th ACM SIGOPS/EuroSys European Conference on Computer Systems (EuroSys), Salzburg, Austria

Cloud9: A Software Testing Service October 2009
3rd SOSP Workshop on Large Scale Distributed Systems and Middleware (LADIS), Big Sky, MT

Teaching

Project Supervision

- *Packaging S2E in a Docker Container* Spring 2015
  Martin Weber - Student assistantship project
- *Symbolic Floating-point Operations Using a SoftFPU* Spring 2015
  Yannick Schaeffer - EPFL bachelor semester project
- *Guest-level API for the S2E symbolic analysis platform* Fall 2014
  Martin Weber - EPFL bachelor semester project
- *Extending Cloud9's POSIX model with signals and symbolic file systems* Spring 2011
  Calin Iorgulescu - Politehnica BSc dissertation
- *Extending Cloud9's POSIX model with IPC and advanced pthreads support* Spring 2011
  Tudor Cazangiu - Politehnica BSc dissertation
- *Converting the CLI subsystem of the Syslinux bootloader from assembly to C* Summer 2009
  Claudiu Mihail - Google Summer of Code project

Teaching Assistant

- *Ecole Polytechnique Federale de Lausanne*
  Software Engineering (Fall 2010, 2012, 2013), Software Development Project (Fall 2010), Probabilities and Statistics (Spring 2012), Programming I (Spring 2014)
- *"Politehnica" University of Bucharest*
  Computer Programming (Fall 2006, 2008), Data Structures (Spring 2007, 2008), Introduction to Operating Systems (Fall 2006, 2007), Compilers Design (Fall 2008)

Professional Service

Member of Program Committees

EuroSys Shadow PC (ACM/SIGOPS European Conference on Computer Systems)	2016
NBiS (Network-Based Information Systems)	2011

External Reviewer

VMCAI (Verification, Model Checking, and Abstract Interpretation)	2016
WOOT (USENIX Workshop on Offensive Technologies)	2015
SAS (International Static Analysis Symposium)	2014
SPE (Software: Practice and Experience)	2014
SOSP (ACM Symposium on Operating Systems Principles)	2011, 2013
HotOS (USENIX Workshop on Hot Topics in Operating Systems)	2013
CIDR (Conference on Innovative Data Systems Research)	2013
SOCC (ACM Symposium on Cloud Computing)	2012
ASPLOS (ACM Conf. on Architectural Support for Prog. Lang. and Operating Systems)	2010, 2011
EuroSys (ACM SIGOPS European Conference on Computer Systems)	2010, 2011
USENIX (USENIX Annual Technical Conference)	2011
SPIN (International Workshop on Model Checking of Software)	2011

Patents

Advantageous State Merging During Symbolic Analysis
Volodymyr Kuznetsov, Johannes Kinder, Stefan Bucur, George Candea
US Patent No. 9,141,354 (September 2015)

Parallel Automated Testing Platform for Software Systems
Stefan Bucur, George Candea, Cristian Zamfir
US Patent No. 8,863,096 (October 2014)

Miscellaneous

Languages: English (fluent), Romanian (fluent), French (basic conversational)

Last updated: February 14, 2016
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