Jonas Wagner

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Research Interests

My mission is to create automated program analysis techniques that help developers construct better software with ease. I prototype these techniques into tools and evaluate them on real-world software systems.

My work lies at the intersection of verification, programming languages, and operating systems. It is currently focused on ASAP, a technique to enforce security properties (e.g., the absence of buffer overflows) at runtime with high performance.

Education

PhD in Computer Science, EPFL: 2011 – present

dslab.epfl.ch

Dependable Systems Lab, EPFL, Lausanne
Under the direction of Prof. George Candea

Master in Communication Systems, EPFL: 2008 - 2011

ssc.epfl.ch/master

School of Computer and Communication Systems, EPFL, Lausanne
Specialization in Internet Computing. Master thesis in industry, on automatic detection of bad performance in VPN tunnels.

Bachelor in Communication Systems, EPFL: 2005 - 2008

ssc.epfl.ch/bachelor

Two years at EPFL, Lausanne, and one year at NTU, Singapore

Projects

ASAP

dslab.epfl.ch/proj/asap

ASAP is an automated approach and tool to instrument programs subject to performance constraints. It combines profiling and compiler techniques to generate programs that are as safe as possible, while satisfying the user's overhead budget.

-Overify

dslab.epfl.ch/pubs/overify.pdf

-Overify is a compiler flag that speeds up software verification by up to 95×. It is based on the insight that compiling for verification requires different optimizations than compiling for fast execution, and introduces a new cost model to generate code that is adapted to the need of verification tools.

Publications

High System-Code Security with Low Overhead

dslab.epfl.ch/proj/asap

Jonas Wagner, Volodymyr Kuznetsov, George Candea, and Johannes Kinder
36th IEEE Symposium on Security and Privacy (S&P), 2015

-Overify: Optimizing Programs for Fast Verification

dslab.epfl.ch/pubs/overify.pdf

Jonas Wagner, Volodymyr Kuznetsov, and George Candea
14th Workshop on Hot Topics in Operating Systems (HotOS), 2013

Work experience

Internship at Google: May to August 2015 www.google.com

I built tools to systematically scan all Android apps for security vulnerabilities. The project used program analysis and abstract interpretation techniques in a distributed cloud setup. It is now running in production at Google and warns app developers whenever a new vulnerability is detected.

Master Thesis at Open Systems: Sept. 2010 to March 2011 www.open.ch

Performance measurement of VPN links and automatic detection of performance degradation. This project combined practical application of Perl, C and Unix with engineering and a solid mathematical foundation. The thesis was awarded the maximum grade and was important for upcoming network monitoring efforts at Open Systems.

Internship at MadeinLocal: Feb. to Aug. 2009 www.madeinlocal.com

Web development for MadeinLocal.com, the next generation local guide powered by social networking. In a dynamic start-up team, I assumed responsibility for developing business logic in Ruby on Rails and JavaScript, and connections to external sites such as Facebook.

Teaching and Professional Service

Teaching Assistant

Software Engineering: 2015, 2014, 2013, 2012
Calculus: 2014
Introduction to Programming: 2012, 2008, 2006
Information Theory and Coding: 2010
Stochastic Models: 2009

Project Supervisor

Summer@EPFL Internship by Azqa Nadeem, 2014
Moodle Accessibility Checker Plugin. 1st year master semester project by Quentin Cosendey, 2014
LibABC: A C Library for Software Analysis. 3rd year bachelor semester project by Florian Vessaz, 2013

Shadow Program Committee Member

EuroSys: European Conference on Computer Systems, 2016

External Reviewer

OSDI: USENIX Symposium on Operating Systems Design and Implementation, 2014
EuroSys: European Conference on Computer Systems, 2014 and 2012
CIDR: Conference on Innovative Data Systems Research, 2013
SOCC: ACM Symposium on Cloud Computing, 2012

Miscellaneous

Languages

German: native
English: Cambridge Certificate of Advanced English (level C1)
French: fluent (level B2)
Spanish: basic (level A2)

PolyProg: Organizing Programming Competitions polyprog.epfl.ch

I am a founding member of PolyProg, a student association at EPFL that promotes algorithmic and programming skills. I've contributed to the organization of numerous programming contests as well as related seminars and trainings.