Jeffrey A. Vaughan

Curriculum Vitae

January 5, 2012

Contact

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Research Interests

My research aims to improve software reliability, security, and privacy by creating technology for specifying and enforcing expressive security policies. Particular areas of research include information flow, fine-grained and proof-carrying access control, automatic audit, and policy semantics.

Education

University of Pennsylvania
Doctor of Philosophy, Computer and Information Science December 2009
Master of Science in Engineering, Computer and Information Science May 2006
Advised by Prof. Steve Zdancewic. Dissertation titled *Aura: Programming with Authorization and Audit.*

Cornell University
Bachelor of Science, Computer Science and Applied and Engineering Physics June 2004
Graduated Cum Laude and with departmental honors.

Research and Industry Experience

University of California, Los Angeles
Postdoctoral Scholar Fall 2010–present
Researching security and programming languages, with an emphasis on mobile devices.

Harvard University, Center for Research on Computation and Society
Postdoctoral Fellow Fall 2009–Fall 2010
Researched "pay-as-you-go" techniques for information flow analysis.

Microsoft
Software Development Engineer Intern Summer 2004
Designed and implemented the MSBuild console logger tool, which shipped with Visual Studio 2005.

Sandia National Laboratories
Technical Intern Summer 2003
Performed error analysis of computer code that interprets material science experiments run on Sandia's Z accelerator. Ran magnetohydrodynamic simulations for Cornell's COBRA accelerator.

Cornell University Laboratory of Plasma Studies
Research Assistant 2000–2004
Investigated physics of plasma formation in x- and z-pinch experiments, including experimental design.

Red Cow Digital Corporation
Sole Proprietor 1997–2004
Developed a law office collections system, PayBack, used to manage more than $1 million annually. Computerized and sold Fannie Mae/Freddie Mac mortgage forms to clients in 21 states.

Conference and Journal Publications

Inference of Expressive Declassification Policies. Jeffrey A. Vaughan and Stephen Chong. *IEEE Security and Privacy (Oakland)*, 2011.

Self-Identifying Sensor Data. Stephen Chong, Christian Skalka, and Jeffrey A. Vaughan. *IEEE International Conference on Information Processing in Sensor Networks (IPSN)*, 2010.

Aura: A Programming Language for Authorization and Audit. Limin Jia, Jeffrey A. Vaughan, Karl Mazurak, Jianzhou Zhao, Luke Zarko, Joseph Schorr, and Steve Zdancewic. *International Conference on Functional Programming (ICFP)*, 2008. (Long version: U. Penn Technical Report MS-CIS-08-10.)

Evidence-based Audit. Jeffrey A. Vaughan, Limin Jia, Karl Mazurak and Steve Zdancewic. *IEEE Computer Security Foundations (CSF)*, 2008. (Long version: U. Penn Technical Report MS-CIS-08-09.)

A Cryptographic Decentralized Label Model. Jeffrey A. Vaughan and Steve Zdancewic. *IEEE Security and Privacy (Oakland)*, 2007.

Relational Lenses: A Language for Updatable Views. Aaron Bohannon, Jeffrey A. Vaughan, and Benjamin C. Pierce. *Principles of Database Systems (PODS)*, 2006.

Factors Affecting Energy Deposition and Expansion in Single Wire Low Current Experiments. Peter U. Duselis, Jeffrey A. Vaughan, and Bruce R. Kusse. *Physics of Plasmas 11,* 2004.

Papers in Submission

Dr. Android and Mr. Hide: Fine-grained Security Policies on Unmodified Android. Jinseong Jeon, Kristopher K. Micinski, Jeffrey A. Vaughan, Nikhilesh Reddy, Yixin Zhu, Jeffrey S. Foster, and Todd Millstein. In submission, 2011.

A Platform for Expressive and Secure Data Sharing with Untrusted Third Parties. Eric Griffis, Jeffrey A. Vaughan, and Todd Millstein. In submission, 2011.

Workshop Papers

A Confidentiality Extension to the Aura Programming Language. Jeffrey A. Vaughan. *Types in Language Design and Implementation (TLDI)*, 2011.

A Framework for Internalizing Relations into Type Theory. Peng Fu, Aaron Stump, and Jeffrey A. Vaughan. *Workshop on Proof-Search in Axiomatic Theories and Type Theories (PSATTT)*, 2011.

A Logical Interpretation of Java-style Exceptions. Jeffrey A. Vaughan. *Workshop on Classical Logic and Computation (CL&C)*, 2010.

SML2Java: A Source to Source Translator. Justin Koser, Haakon Larsen and Jeffrey A. Vaughan. *Workshop on Declarative Programming in the Context of Object-Oriented Languages (DPCOOL)*, 2003.

Invited Talks

Inference of Expressive Information Flow Policies. Presented at HRL Laboratories, Malibu, July 2011. Also presented at Microsoft Research, Redmond, August 2011.

Information-flow for Everyone. Presented at the Center for Embedded Networked Sensing seminar, UCLA, November 2010.

Work in Progress: Declassification Policy Inference. Presented at the Cambridge University Logic and Semantics seminar, Cambridge, UK, April 2010.

Aura: Programming with Authorization and Audit. Presented at the Harvard Center for Research on Computation and Society seminar, Cambridge, MA, November 2009, at the Northeastern University Programming Languages Seminar, Boston, February 2010, and at Brown University, Providence, June 2010.

Authorization, Audit, and Provenance in the Aura System. Presented at the Symposium on Provenance in Software Systems, Edinburgh, UK, March 2009.

Research Advising

All students co-advised with Todd Millstein.

Nikhilesh Reddy, UCLA, Masters thesis: *ACPLib: App-Centric Security Policies on Unmodified Android*. Graduated summer 2011. Currently at Qualcomm.

Eric Griffis, UCLA, Undergraduate directed research: *The Taming of the View: Leveraging Views for Drop-in Performance Gains*. Graduated spring 2011. Currently a masters student working with Todd Millstein and myself on personal data vaults; coauthor on paper in submission.

Yixin Zhu, UCLA, Cross-disciplinary Scholars in Science and Technology intern from Xi'an Jiaotong University, China. Implemented privacy preserving ad libraries; coauthor on paper in submission.

Jiatong He, UCLA, High School Summer Research Program. Project: *Fling—Utilization of Application-Centric Permissions on the Android OS*, 2011.

Teaching Experience

Guest Lectures
Static Information Flow. For UCLA CS 231: Types and Programming Languages. November 2011
Dependent types. For Harvard University CS 152: Programming Languages. April 2010

CIS 399–005: C♯ Programming
Instructor, U. Penn Spring 2008 and 2009
An undergraduate programming class focusing on program implementation using modern language features. Formulated curriculum, wrote and delivered all lectures, and designed and graded assignments.

CIS 551: Computer and Network Security
Teaching Assistant, U. Penn Spring 2007
A graduate level security class. Delivered guest lectures, graded projects and exams, monitored the class email list, and met with students during office hours.

CSE 121: Data Structures with Java
Teaching Assistant, U. Penn Spring 2006
An introductory programming course. Led a recitation, graded, and met with students during office hours.

CSE 380: Operating Systems
Teaching Assistant, U. Penn Fall 2005
A upper-level undergraduate class associated with a large-scale programming practicum. Graded homework and exams, monitored the class email list, and met with students during office hours.

CS 312: Data Structures and Functional Programming
Consultant/Teaching Assistant, Cornell Fall 2002–Spring 2004
A challenging undergraduate class. Taught recitations, wrote lecture notes for other recitations, designed problem sets, graded projects and exams.Received teaching award.

Academic Service

Multi-institution Seminar and Tutorial Organization
SoCal Programming Languages and Systems Workshop Steering Committee, 2011–present
SoCal PLS Workshop Organizer, December 2010 at UCLA; Co-organizer, April 2011 at Pomona College
Proof Assistants for Programming Language Research, Tutorial Co-organizer, POPL, January 2008

Departmental Service
Programming Languages Reading Group Organizer, UCLA, Fall 2010–Spring 2011
Systems Seminar Co-organizer, U. Penn, Spring and Summer 2009
CIS TGIF Happy Hour Organizer, U. Penn, 2006–2009
PLClub Seminar Organizer, U. Penn, Spring 2007–Fall 2007

Journal Reviews
Transactions on Information and System Security, 2011
Transactions on Computational Science, 2010
Journal of Functional Programming, 2010
Information and Computation, 2007
Journal of Computer Security, 2007 and 2011

External Conference and Workshop Reviews
Asian Symposium on Programming Languages and Systems (APLAS), 2009
Automated Technology for Verification and Analysis (ATVA), 2009
Computer Security Foundations (CSF), 2010 and 2007
European Symposium on Programming (ESOP), 2011
European Symposium on Research in Computer Security (ESORICS), 2011
International Conference on Functional Programming (ICFP), 2011, 2010 and 2007
Logic in Computer Science (LICS), 2011
Mathematical Foundations of Computer Science (MFCS), 2010
Principles of Programming Languages (POPL), 2008 and 2006
Programming Languages and Analysis for Security (PLAS), 2010
Programming Languages meets Program Verification (PLPV), 2008
USENIX Workshop on Hot Topics in Security (HotSec), 2007

Outreach
CENS Career Pathways Workshop Panelist (for high school and undergraduate students), UCLA, July 2011
Intel International Science and Engineering Fair Judge, Los Angeles, May 2011

Awards

Center for Teaching and Learning Certificate, U. Penn, 2009
Best Poster, Second Prize, Greater Philadelphia DB/IR Day, 2005
Departmental Honors, Cornell Computer Science, 2004
Departmental Honors, Cornell Engineering Physics, 2004
Teaching Assistant Award, Cornell Computer Science, 2004
Eagle Scout, 2000