

Jeffrey A. Vaughan

Computer and Information Science
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Interests

I am interested in the intersection of computer security, programming languages, and formal methods. Particular areas of interest include access control, information flow, the theory and application of dependent types, and mechanized metatheory.

Education

University of Pennsylvania

Doctoral Candidate

September 2004 – present

Master of Science

May 2006

Graduate student in Computer and Information Science. Completed all class, teaching, and exam requirements. Advised by Prof. Steve Zdancewic.

Cornell University College of Engineering

Bachelor of Science

Graduated June 2004

Dual major in Applied and Engineering Physics and Computer Science. Conducted two independent research projects: one concerning source-level computer language translation, the other plasma physics. Graduated Cum Laude.

Employment

Microsoft

Software Development Engineer Intern

Summer 2004

Designed, implemented, and tested code for the MSBuild console logger, part of the .Net software developer kit. This tool was shipped to customers with Visual Studio 2005. Practiced test driven development and agile programming.

Sandia National Laboratories

Technical Intern

Summer 2003

Performed error analysis of computer code that interprets material science experiments run on the Z accelerator. Ran magnetohydrodynamic simulations of experiments for Cornell University's COBRA accelerator.

Cornell University Laboratory of Plasma Studies

Research Assistant

2000 – 2004

Investigated fundamental physics of electrical current breakdown and plasma formation. Researched using x-rays for high resolution biological imaging. Designed experimental apparatus for single wire z-pinch experiments. Developed an image correction algorithm for quantitative analysis of plasma energy and density.

Red Cow Digital Corporation

Sole Proprietor

1997 – 2004

Designed and ran a profitable e-commerce website. Developed a law office collections system, PayBack. This program includes a user-friendly interface and advanced reporting features; it has been in daily use by a New York law firm for seven years. Computerized and sold Fannie Mae/Freddie Mac mortgage forms to clients in 21 states.

Publications

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*, 2008. (A long version of this work appeared as U. Pennsylvania Technical Report MS-CIS-08-09.)

Evidence-based Audit. Jeffrey A. Vaughan, Limin Jia, Karl Mazurak and Steve Zdancewic. *IEEE Computer Security Foundations*, 2008. (A long version of this work appeared as U. Pennsylvania Technical Report MS-CIS-08-09.)

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

A Review of Three Techniques for Formally Representing Variable Binding. Jeffrey A. Vaughan. *Technical Report MS-CIS-06-19*, University of Pennsylvania CIS, Dec. 2006.

Relational Lenses: A Language for Updatable Views. Aaron Bohannon, Jeffrey A. Vaughan, and Benjamin C. Pierce. *Principles of Database Systems (PODS)*, 2006. (A long version of the work appeared as U. Pennsylvania Technical Report MS-CIS-05-27.)

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* (2003).

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, 4025 (2004).

Presentations

Aura: A programming language for authorization and audit. Presented at the International Conference on Functional Programming, Victoria, BC, Canada, Fall 2008.

Normalization in the Dual Calculus with Sigma Reductions. Poster presentation at the International Conference on Functional Programming, Victoria, BC, Canada, Fall 2008.

Evidence-based Audit. Presented at IBM Programming Languages Day joint with NJPLS and MAPLS, Hawthorne, NY, August 2008.

Evidence-based Audit. Presented at a joint session of the Computer Security Foundations Symposium and the Symposium on Logic In Computer Science, Pittsburgh, PA, June 2008.

Dependent Types for Security Assertions (Work in Progress). Presented at the Marktoberdorf Summer School, Marktoberdorf, Germany, August 2007.

A Cryptographic Decentralized Label Model. Presented at IEEE Security and Privacy, Oakland, CA, May 2007.

Relational Lenses: A Language for Updatable Views. Poster presentation with Aaron Bohannon at the Greater Philadelphia DB/IR Day, Philadelphia, PA, Fall 2005.

SML2Java: A Source To Source Translator. Presentation with Haakon Larsen at Declarative Programming in the Context of Object-Oriented Languages, Uppsala, Sweden, August 2003.

Teaching Experience

CIS 399-005: C# Programming

Instructor

Spring 2008

An undergraduate programming class focusing on program implementation using modern language features. Wrote and delivered all lectures. Designed and graded assignments. Held office hours.

CIS 551: Computer and Network Security

Teaching Assistant

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

Spring 2006

An introductory programming course. Lead a recitation with about 20 students, graded homework and exams, and met with students during office hours.

CSE 380: Operating Systems

Teaching Assistant

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 student during office hours.

CS 312: Data Structures and Functional Programming (Cornell University)

Teaching Assistant

Spring 2003–Spring 2004

Consultant

Fall 2003

A challenging undergraduate course emphasizing rigorous design and coding practices. Co-taught recitations, wrote lecture notes for other recitations, designed problem sets, graded projects and exams, monitored class the newsgroup and email list, and met with students during office hours.

Community and Departmental Service

Tutorial Co-organizer: Using Proof Assistants for Programming Language Research or, How to write your next POPL paper in Coq, January 2008

Penn CIS TGIF Happy Hour Organizer 2006–present

PLClub Seminar Organizer Spring 2007–Fall 2007

Journal Reviews

Information and Computation, 2007

Journal of Computer Security, 2007

External Conference Reviews

Principles of Programming Languages (POPL), 2008

USENIX Workshop on Hot Topics in Security (HotSec), 2007

International Conference on Functional Programming (ICFP), 2007

Computer Security Foundations (CSF), 2007

Principals of Programming Languages (POPL), 2006

Awards

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

Cornell Presidential Research Scholar, 2000–2004

Eagle Scout, 2000