

Christopher D. Richards

<http://mauka.net/cdrichards/>

Education

Princeton University, Princeton, NJ
Ph.D. in Computer Science, June 2010
Dissertation Title: *The Approximation Modality in Models of Higher-Order Types*
Advisor: Andrew W. Appel

Princeton University, Princeton, NJ
M.A. in Computer Science, November 2002, GPA: 3.80

Williams College, Williamstown, MA
B.A. *cum laude* in Computer Science, May 2000, GPA: 3.71

Professional Experience

Princeton University
Doctoral Candidate 2006–2010
Developed system to encode safety invariants for machine code programs using principles from mathematical logic.

Research Assistant 2000–2005
Developed Foundational Proof-Carrying Code for certifying safety of machine-code programs. Maintained 140,000-line code base (Twelf—logic programming and theorem proving) and developed supporting tools (Awk). Proved theorems in machine-checked formal logic. Improved type systems for machine code.

Petitioners in *Banfield v. Cortés* (Pa. Commw. Ct.) February 2010
Consultant (pro bono)
Advised counsel on protective order establishing rules for expert examination of electronic voting machines.

Plaintiffs in *Gusciora v. Corzine* (N.J. Super. Ct. Law Div.) Summer 2008
Expert Study Group Member (pro bono)
Analyzed security and accuracy of Sequoia AVC Advantage voting machine with plaintiff's expert witness. Audited source code (C, Z80 assembly) and crafted exploits.

AT&T Labs—Research Summer 2000
Summer Manager Advisor: Richard W. Sproat
Upgraded the *lertools* software package for language analysis, with emphasis on modularity and maintainability.

Johns Hopkins University Summer 1999
Intern Advisor: Richard W. Sproat
National Science Foundation internship at the Center for Language and Speech Processing. Investigated text normalization using weighted finite-state transducers and regular expressions.

	Williams Students Online, wso.williams.edu <i>System Administrator</i>	1997-2000
	Maintained over 2,000 web and email accounts. Installed, configured, and maintained hardware and software for Linux, Solaris, and Macintosh servers. Developed policies and mentored new administrators.	
Related Experience	The Twelf Project, www.twelf.org <i>Contributor</i>	2003-2005
	Improved the build system (ML, makefile) and development-environment integration (Emacs Lisp). Audited performance benchmarks.	
	The NetBSD Project, www.netbsd.org <i>Contributor</i>	2002-2003
	Improved and upgraded the NetBSD packages for SML/NJ, Coq, and Twelf (makefile).	
Refereed Publications	<i>Semantic Foundations for Typed Assembly Languages</i> . Amal Ahmed, Andrew W. Appel, Christopher D. Richards, Gang Tan, and Daniel C. Wang. <i>ACM Transactions on Programming Languages and Systems (TOPLAS)</i> , 32(3):1-67, March 2010.	
	<i>The New Jersey Voting-Machine Lawsuit and the AVC Advantage DRE Voting Machine</i> . A.W. Appel, M. Ginsburg, H. Hursti, B.W. Kernighan, C.D. Richards, G. Tan, and P. Venetis. In <i>EVT/WOTE '09: Proceedings of the 2009 USENIX/Accurate/IAVoSS Electronic Voting Technology Workshop/Workshop on Trustworthy Elections</i> , August 2009.	
	<i>A Very Modal Model of a Modern, Major, General Type System</i> . Andrew W. Appel, Paul-André Melliès, Christopher D. Richards, and Jérôme Vouillon. In <i>POPL '07: Proceedings of the 34th Annual ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages</i> , January 2007.	
	<i>Normalization of Non-Standard Words</i> . R. Sproat, A. Black, S. Chen, S. Kumar, M. Ostendorf, and C. Richards. <i>Computer Speech & Language</i> , 15(3):287-333, July 2001.	
Other Publications	<i>The Approximation Modality in Models of Higher-Order Types</i> . Christopher D. Richards. PhD thesis, Princeton University, June 2010.	
	<i>Insecurities and Inaccuracies of the Sequoia AVC Advantage 9.00H DRE Voting Machine</i> . Andrew W. Appel, Maia Ginsburg, Harri Hursti, Brian W. Kernighan, Christopher D. Richards, and Gang Tan, October 2008.	
	<i>A Kind System for Typed Machine Language</i> . Andrew W. Appel, Christopher D. Richards, and Kedar N. Swadi. Princeton University, October 2002.	
Presentations	<i>The Approximation Modality in Models of Higher-Order Types</i> . Dissertation defense, Princeton University, April 2010.	

A Very Modal Model of a Modern, Major, General Type System. Presented at the Symposium on Principles of Programming Languages (POPL), Nice, France, January 2007.

A Very Modal Model of a Modern, Major, General Type System. Presented at the New Jersey Programming Languages Seminar (NJPLS), Princeton, NJ, October 2006.

Representing Machine Instruction Syntax in Higher-Order Logic. Oral exam presentation, Princeton University, May 2002.

Normalization of Non-Standard Words. Presented at Workshop '99, Center for Language and Speech Processing, Johns Hopkins University, August 1999.

Teaching

Teaching Assistant, Princeton University Fall 2006
COS 441: Programming Languages Instructor: Andrew W. Appel
Held office hours, graded assignments, and led class as needed.

Teaching Assistant, Princeton University Fall 2001
COS 109: Computers in Our World Instructor: Brian W. Kernighan
Graded assignments.

Teaching Assistant, Princeton University Spring 2001
COS 320: Compilers Instructor: David I. August
Guided special projects, held office hours, and graded assignments.

Skills

Languages. ML, Java, C, Python, Unix shell, Awk, Lisp, Twelf, Coq, LaTeX
Systems. Linux/BSD/Solaris, Mac OS X, Windows

References

Available upon request.