

William Harris

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Research Interests

I am interested in programming languages, program analysis, and their application to problems in the domain of software correctness and security. Presently, I am applying formal methods to extend real-world programs to support security and functionality guarantees.

Education

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| 2007 – present | Ph.D. in Computer Sciences (minor in Mathematics)
University of Wisconsin, Madison, WI, USA.
Advisors: Somesh Jha and Thomas Reps
3.864 / 4.000 GPA |
| 2003 – 2007 | B. S. (Honors, with Distinction) in Computer Science and Mathematics, May 2007.
Purdue University, West Lafayette, IN, USA.
3.87 / 4.00 GPA |

Research Experience

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| 2007 – present | <i>Research Assistant</i>
University of Wisconsin, Madison, WI, USA.
Apply program analysis and program synthesis techniques to problems in system security. |
| 2010 | <i>Summer Research Assistant</i>
Microsoft Research, Redmond, WA, USA. |
| 2009 | <i>Summer Research Assistant</i>
Microsoft Research India, Bangalore, India.
Developed a novel program analysis to prove termination for whole programs by simultaneously refining over and under-approximate models of a program. |
| 2008 | <i>Summer Research Assistant</i>
NEC Laboratories America, Princeton, NJ, USA.
Developed a novel program analysis to efficiently prove partial correctness of programs using path-sensitive analysis. |
| 2005 – 2007 | <i>Research Assistant</i>
Purdue University, West Lafayette, IN, USA.
Designed and implemented support for pattern matching in the Java programming language and designed a domain-specific language for controlling a large, electronic sculpture. |

Research Experience (continued)

- 2006 *Summer Research Assistant*
Texas A&M University, College Station, TX, USA.
Developed techniques for automatically detecting parallelization using speculative execution.

Publications

- William R. Harris and Sumit Gulwani. *Spreadsheet Table Transformations from Examples*. To appear in the proceedings of *Programming Language Design and Implementation 2011*.
- William R. Harris, Somesh Jha, and Thomas W. Reps. *DIFC Programs by Automatic Instrumentation*. In the proceedings of *Computer and Communications Security 2010*.
- William R. Harris, Akash Lal, Aditya V. Nori, and Sriram K. Rajamani. *Alternation for Termination*. In the proceedings of *Static Analysis Symposium 2010*.
- William R. Harris, Sriram Sankaranarayanan, Franjo Invancic, and Aarti Gupta. *Program Analysis via Satisfiability Modulo Path Programs*. In the proceedings of *Principles of Programming Languages 2010*.
- William R. Harris, Nicholas A. Kidd, Sagar Chaki, Somesh Jha, and Thomas W. Reps. *Verifying Information Flow Control Over Unbounded Processes*. In the proceedings of *Formal Methods 2009*.

Academic Talks

- 2011 *Policy Weaving for Secure Systems*
MIT Programming Languages Working Group
Massachusetts Institute of Technology, Boston, MA, USA
- 2010 *DIFC Programs by Automatic Instrumentation*
Computer and Communications Security 2010, Chicago, Illinois, USA
- 2010 *Alternation of Termination*
Static Analysis Symposium 2010, Perpignan, France
- 2010 *Program Analysis via Satisfiability Modulo Path Programs*
Principles of Programming Languages 2010, Madrid, Spain, USA
- 2009 *Verifying Information Flow Control Over Unbounded Processes*
Formal Methods 2009, Eindhoven, North Brabant, Netherlands

Teaching Experience

- 2007 – 2008 Project Mentor for “Introduction to Information Security.”
Graduate and senior-undergraduate level course. Instructor: Somesh Jha. (University of Wisconsin, Madison, CS 642)

Teaching Experience (continued)

- 2004 – 2007 Lab Teaching Assistant for “Introduction to Java.”
Freshman-undergraduate level course. Instructor: H. E. Dunsmore. (Purdue University, CS 180)
- 2005 Lab Teaching Assistant for “Ordinary Differential Equations.”
Sophomore-undergraduate level course. Instructor: Johnny Brown. (Purdue University, MA 366)

Software Development

- 2007 *Software Engineering Intern*, Google Inc., Mountain View, CA, USA.
Extended an application testing framework to collect hardware profiling information and analyze performance for correlations between events.
- 2005 *IT Department Intern*, Caterpillar Inc., West Lafayette, IN, USA.
Designed and implemented an application for monitoring server performance. Supported engineering applications.

Awards and Honorary Organizations

- 2010-11 *Microsoft Research Graduate Fellowship Award*
- 2009 *National Science Foundation Graduate Research Fellowship Program: Honorable Mention*
- 2007 *Glen E. Baxter Award*
- 2007 *Phi Beta Kappa: Member*
- 2006 *Upsilon Pi Epsilon: Member*
- 2006 *Purdue University Dept. of Computer Science Scholarship*
- 2003 *National Merit Scholar*

Community

- 2011 *Reviewer: Journal of Computer Security*
- 2010 *External Reviewer: Computer and Communications Security*
- 2010 *External Reviewer: IEEE Symposium on Security and Privacy*
- 2010 *External Reviewer: USENIX Security Symposium*
- 2009 *External Reviewer: Static Analysis Symposium*
- 2008 *External Reviewer: Computer Communications Review*
- 2008 *External Reviewer: IEEE Symposium on Security and Privacy*

Community (continued)

2008 *IEEE: Student Member*

2008 *UW-Madison Dept. of Computer Sciences Graduate Admissions Committee Member*

2007 *ACM: Student Member*