

RESEARCH INTEREST

Programming language implementation, runtime systems, and operating systems, with an emphasis on the software/hardware interface, code generation, building robust software automatically, artificial intelligence, web-oriented systems, and computer science education.

EDUCATION

- Ph.D. in Computer Science**, UNIVERSITY OF MASSACHUSETTS AMHERST, February 2010
Thesis: *Generalized Instruction Selector Generation: The Automatic Construction of Instruction Selectors from Descriptions of Compiler Internal Forms and Target Machines*
Advisors: J. Eliot B. Moss and Charles C. Weems
- M.S., Computer Science**, UNIVERSITY OF MASSACHUSETTS AMHERST, Spring 2006
Master's Thesis: *Proving the Equivalence of Instruction Semantics*
Advisors: J. Eliot B. Moss and Charles C. Weems
- B.A. in Computer Science**, Magna Cum Laude, CLARK UNIVERSITY, 1999

ACADEMIC POSITIONS & PROFESSIONAL EXPERIENCE

- Visiting Assistant Professor**, TRINITY COLLEGE, Hartford, CT, 2009 – present
Adjunct Faculty Member, CLARK UNIVERSITY, Worcester, MA, 2007 – 2008
Adjunct Faculty Member, SPRINGFIELD COLLEGE, Springfield, MA, 2007 – 2008
Graduate Research Assistant, UNIVERSITY OF MASSACHUSETTS AMHERST, 2002 – 2009
Software Engineer II, CONCORD COMMUNICATIONS, Marlboro, MA, 2000 – 2001
Systems Software Engineer, DIGITAL EQUIPMENT CORPORATION, Shrewsbury, MA, 1999 – 2000

JOURNAL PUBLICATIONS

1. **CASL: A Rapid-prototyping Language for Modern Micro-Architectures**, Edward K. Walters II, J. Eliot B. Moss, Trek Palmer, Timothy Richards, and Charles C. Weems. In *Computer Languages, Systems, and Structures*, 2007, Volume 34/4, pp. 195-211.
2. **CISL: A Class-based Machine Description Language for Co-Generation of Compilers and Simulators**, J. Eliot B. Moss, Trek Palmer, Timothy Richards, Edward K. Walters II, and Charles C. Weems. In *International Journal of Parallel Programming*, Springer-Verlag, Volume 33, Numbers 2-3, pp. 231-246, June 2005.

WORKSHOP PUBLICATIONS

1. **Towards Universal Code Generator Generation**, Timothy Richards, Edward K. Walters II, J. Eliot B. Moss, Trek Palmer, and Charles C. Weems. In *Proceedings of the 2008 International Parallel and Distributed Processing Workshop on Next Generation Software*, Miami, FL, April 2008.
2. **CMDL: A Class-based Machine Description Language for Co-Generation of Compilers and Simulators**, J. Eliot B. Moss, Trek Palmer, Timothy Richards, Edward K. Walters II, and Charles C. Weems. In *Proceedings of the 2004 International Parallel and Distributed Processing Symposium Workshop on Next Generation Software*, Santa Fe, NM, April 2004.
3. **The CoGenT Project: Co-Generating Compilers and Simulators for Dynamically Compiled Languages**, J. Eliot B. Moss, Charles C. Weems, and Timothy Richards. In *Proceedings of the 2003 International Parallel and Distributed Processing Symposium Workshop on Next Generation Software*, Nice, France, April 2003.

TECHNICAL REPORTS

1. **A Unified Framework for the Automatic Generation of System Tools and Components**, Timothy Richards, Edward K. Walters II, Trek Palmer, J. Eliot B. Moss, and Charles C. Weems. UMass CS Technical Report TR-07-56, 2007.

TEACHING EXPERIENCE

Visiting Assistant Professor, TRINITY COLLEGE, *Department of Computer Science*

- CPSC 415: *Advanced Web Programming* (new)
Spring 2010
- CPSC 372: *Database Fundamentals*
Fall 2009, Fall 2010
- CPSC 371: *Compiler Techniques*
Spring 2011
- CPSC 333: *Computer Networks*
Spring 2010
- CPSC 225: *Server-side Web Programming* (new)
Fall 2010
- CPSC 225: *Client-side Web Programming* (new)
Spring 2011
- CPSC 110: *Computers, Information, & Society*
Fall 2009, Spring 2010, Spring 2011

Instructor, CLARK UNIVERSITY, *Department of Math & Computer Science*

- CSCI 230: *Compiler Design*
Spring 2008

Instructor, SPRINGFIELD COLLEGE, *Department of Mathematics, Physics, & Computer Science*

- CISC 105: *Introduction to Computers* (two sections, 80 students)
Fall 2007

Teaching Assistant, UNIVERSITY OF MASSACHUSETTS AMHERST, *Department of Computer Science*

- CMPSCI 610: *Compiler Techniques* (combined graduate/undergraduate)
Fall 2003, Fall 2004, Fall 2007, Fall 2008
- CMPSCI 611x: *Advanced Algorithms*
Spring 2006

REU Mentor, UNIVERSITY OF MASSACHUSETTS AMHERST, *Research Experience for Undergraduates* Summer 2007, 2008, 2009, 2010

CS Mentor, UNIVERSITY PARK CAMPUS SCHOOL, Worcester, MA, *Clark University Partnership* Ongoing

TALKS

1. **GIST: Generalized Instruction Selector Generation**, *University of Delaware*, Spring 2011 (to appear)
2. **GIST: Generalized Instruction Selector Generation**, *Trinity College*, April 2010
3. **GIST: Generating Instruction Selectors Automatically**, *DaCapo ITR Grant Meeting*, Tufts University, May 2009
4. **Towards Universal Code Generator Generation**, *International Parallel and Distributed Processing Workshop on Next Generation Software*, Miami, FL, April 2008
5. **Universal Code Generator Generation**, *DaCapo ITR Grant Meeting*, University of Massachusetts Amherst, January 2008
6. **Automatic Generation of Functional Simulators from Machine Descriptions**, *invited talk*, Clark University, MA, Spring 2007

7. **The CoGenT Project: Co-Generating Compilers and Simulators for Dynamically Compiled Languages**, *DaCapo ITR Grant Meeting*, Albuquerque, NM, August 2003

RESEARCH SUPPORT

1. **Automatic and Reusable Generation of Practical Instruction Selectors: Realistic Vision or Mirage**, *National Science Foundation CSR Small*, 3 years, (in submission)
2. **Student Research Program**, *Accelerating JavaScript with Safety and Reliability*, \$3500, Summer 2011, (accepted)

I made significant contributions toward the research and writing of the following grant awards that funded my work as a graduate student and three other students in the Architecture & Language Implementation Laboratory in the Computer Science Department at the University of Massachusetts Amherst:

3. **Describing the Operating System for Accurate User-mode Simulation**, *National Science Foundation CSR SGER*, \$186,770, 2008-2010
4. **CoGenT: CoGenerating Tools for Modeling Next Generation Systems**, *National Science Foundation CSR SMA*, \$299,999, 2006-2009
5. **Bridging the Compiler-Simulator Gap: Co-Optimizing Hardware and Software for Dynamically Compiled Languages**, *National Science Foundation*, \$300,000, 2003-2006
6. **Supporting Compiler/Simulator CoEvolution for Architectural Exploration and Evaluation**, *National Science Foundation*, \$49,990, 2002

UNDERGRADUATE STUDENTS SUPERVISED

Capstone Research Project

TRINITY COLLEGE, *Department of Computer Science*

Prasanna Gautam, 2010

Christopher Hawley, 2009

Dana Merrick, 2009

Research Experience for Undergraduates

UNIVERSITY OF MASSACHUSETTS AMHERST, *Department of Computer Science*

Eli Lindsey, Summer 2010

Prasanna Gautam, Summer 2010

Adam Fidel, Summer 2009

Addison Mayberry, Summer 2009

Chujiao Ma, Summer 2009

Kathryn Tipton, Summer 2008

Natasha Kellaway, Summer 2008

Lauren Benson, Summer 2007

Andrea Nickel, Summer 2007

Kate Peterson, Summer 2007

PROFESSIONAL ACTIVITIES AND SOCIETIES

1. CTW Computer Science Course Module, Online Multi-player Adventure Game, Summer 2010
2. CTW Computer Science Course Module, Distributed Hash Tables, Summer 2010
3. Technical Book Reviewer, Nell Dale and Chip Weems, *Programming and Problem Solving with Java*, Second Edition, Jones and Bartlett Publishers Inc., 2008, 838 pp.
4. Reviewer, Architecture Support for Programming Languages and Operating Systems (ASPLOS) 2008,
5. Reviewer, Programming Language Design and Implementation (PLDI) 2007
6. Member of Association for Computing Machinery (ACM)
7. Phi Beta Kappa

HONORS AND AWARDS

1. Thomas Jefferson Award Recipient, University Park Campus School, Worcester Public Schools

SOFTWARE

GIST	A tool for generating instruction selectors automatically from machine descriptions of compiler IR and target instruction sets.
FSGEN	A tool for generating functional simulators from the CISL machine description language.
CISL Compiler	A compiler for parsing, analyzing, and generating an intermediate representation for the CISL machine description language.
CSCI 230 Decaf Compiler	A compiler implemented in Java to compile a C-like language (Decaf) into JVM bytecode. This was used as the class project for CSCI 230 Compiler Design at Clark University.
PISA	A theorem proving system written in Scheme using term rewriting techniques specifically designed for proving the equivalence of machine instruction semantics.
Rolecks	A functional simulator for the ARM architecture written in Java. This simulator was implemented to study instruction semantics, automatic generation of functional simulator components, and the use of Java as an implementation language for functional simulator implementation. Rolecks was used in CMPSCI 201 (<i>Architecture and Assembly Language</i>) and CMPSCI11B (<i>Inside the Box: How Computers Really Work</i>) in the CS department at UMass Amherst during the Spring 2005 and Spring 2010 semesters respectively.
Swatch	A two-pass assembler for the ARM instruction set written in Java. This was used to study the automatic generation of assembler/disassembler components.
CMPSCI 410/610 Pascal Compiler	A Pascal compiler implemented in Java targeting the MIPS processor for a combined graduate/undergraduate course on Compiler Techniques in the CS department at UMass Amherst.