

Curriculum Vitae Aaron D. Stump

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EDUCATION AND PROFESSIONAL HISTORY

Higher Education

Stanford University, Department of Computer Science. Ph.D., August 2002. Thesis title: “Checking Validities and Proofs with CVC and Flea.”

Cornell University, College of Arts and Sciences. BA, May 1997. Computer Science, Philosophy.

Academic Positions

Associate Professor of Computer Science, July 2008 to the present, The University of Iowa.

Assistant Professor of Computer Science and Engineering, Fall 2002 to June 2008, Washington University in St. Louis.

Honors and Awards

National Science Foundation CAREER (“Young Investigator”) award, \$400,000, August 1, 2005 - July 31, 2010.

Memberships

Association of Automated Reasoning (AAR), member.

Association of Computing Machinery (ACM), Special Interest Group on Programming Languages, member.

TEACHING AT THE UNIVERSITY OF IOWA (2008-2009)

Teaching Assignments

SEMESTER	ADVISEES		COURSES TAUGHT	
	Ugrad	Grad	Course Number and Title	Students Enrolled
Fall 2010	6	3	22C:002, "First-Year Seminar: Inventing Languages: Computer Programs, Music Notation, Sports Plays, and Beyond"	14
			22C:185:001, "Programming Language Foundations"	12
Spring 2009	0	2	22C:196:003, "Topics in Computer Science: Verified Software Construction"	14
Fall 2008	0	2	22C:185:001, "Programming Language Foundations"	18

Students Supervised

Degree Objective	Student Name	Years	Outcome
Ph.D.	Peng (Frank) Fu	2009	ongoing
	Duckki Oe	2008-2009	ongoing
	Andy Reynolds	2008-2009	advised now by Prof. Cesare Tinelli
Undergraduate	John Hughes	2009	ongoing
	Gregory Witt	2009	ongoing

TEACHING AT WASHINGTON UNIVERSITY IN ST. LOUIS (2002-2008)

Teaching Assignments

SEMESTER	COURSES TAUGHT	
	Course Number and Title	Students Enrolled
Spring 2008	CSE 240, "Logic and Discrete Mathematics for Computer Science"	24
Fall 2007	CSE 545, "Introduction to Automated Theorem Proving"	10
Spring 2007	CSE 240, "Logic and Discrete Mathematics for Computer Science"	22
Fall 2006	CSE 535, "Programming Languages Theory"	20
Spring 2006	CSE 240, "Logic and Discrete Mathematics for Computer Science"	26
	CSE 7412, "Research Seminar on Computational Logic: Proof Theory"	4
Fall 2005	CSE 545, "Introduction to Automated Theorem Proving"	10
Spring 2005	CSE 7411, "Research Seminar on Computational Logic: Equational Theorem Proving"	5
	CSE 240, "Logic and Discrete Mathematics for Computer Science"	24
Fall 2004	CSE 535, "Programming Languages Theory"	13
Spring 2004	CS 6822, "Research Seminar on Computational Logic: Model Checking"	6
	CS 201, "Formal Foundations of Computer Science"	26
Fall 2003	CS 6821, "Research Seminar on Computational Logic: Dynamic Logic"	6
	CS 102, "Computer Science II"	13
Spring 2003	CS 431, "Translation of Computer Languages"	49

Students Supervised

Degree Objective	Student Name	Years	Outcome
Ph.D.	Edwin Westbrook	2003-2008	postdoc at Rice University
Master's	Andrew Reynolds	2007-2008	doctoral student at Iowa
	Adam Petcher	2007-2008	MIT Lincoln Labs
	Benjamin Delaware	2006-2007	doctoral student at U. T. Austin
	Ian Wehrman	2005-2006	doctoral student at U. T. Austin
	Li-Yang Tan	2005-2006	doctoral student at Columbia
	Joel Brandt	2004-2005	doctoral student at Stanford
Postdoc	Morgan Deters	2007-2008	postdoc at T. U. Catalonia
Undergraduate	Michael Zeller	2005-2007	doctoral student at U. C. Irvine
Honors undergraduate	Todd Schiller	2008	honor's thesis, doctoral student at U. Washington
	Megan Bailey	2007-2008	honor's thesis

TEACHING AT STANFORD UNIVERSITY (2002)

Teaching Assignments

SEMESTER	COURSES TAUGHT	
	Course Number and Title	Students Enrolled
Summer 2002	CS 193D, "C++ and Object-Oriented Programming"	34

SCHOLARSHIP

A few notes are required for the following:

- Following University of Iowa guidelines, "*" means major contribution or senior author (which I interpret to include when the other authors were my students at the time the work was done), "***" means secondary contribution (which I interpret to mean a significant contribution, but not a leadership role in writing the paper or in the work done), "****" means equal contribution, and "*****" means minor contribution.
- Papers with 10 or more citation counts according to Google Scholar as of September 24, 2009 are underlined, with citation counts listed in brackets. There are 17 such papers listed below.
- My h-index is currently 14. That is, 14 papers have 14 citations or more, and that is the largest N such that N papers have N citations or more.
- Internet searches will turn up papers co-authored by another Aaron D. Stump in materials engineering.

Publications in Print Journals

Design and Results of the 3rd Annual Satisfiability Modulo Theories Competition (SMT-COMP 2007) *.** Clark Barrett, Morgan Deters, Albert Oliveras, and Aaron Stump. International Journal of Artificial Intelligence Tools, volume 17, number 4, 2008, pages 569-606.

Directly Reflective Meta-Programming. Aaron Stump. The Journal of Higher Order and Symbolic Computation, to appear (available online from the journal's web page as of January, 2008). 30 pages.

Design and Results of the 2nd Annual Satisfiability Modulo Theories Competition (SMT-COMP 2006) *.** Clark Barrett, Leonardo de Moura, and Aaron Stump. Formal Methods in System Design, volume 31, number 3, 2007, pages 221-239.

Knuth-Bendix Completion of Theories of Commuting Group Endomorphisms *. Aaron Stump and Bernd Loechner. Information Processing Letters, Volume 98, Issue 5, 2006, pages 195-198.

Design and Results of the 1st Satisfiability Modulo Theories Competition (SMT-COMP 2005) [19] *.** Clark Barrett, Leonardo de Moura, and Aaron Stump. Journal of Automated Reasoning, Volume 35, 2006, pages 373-390.

A Trustworthy Proof Checker [38] **. Andrew W. Appel, Neophytos Michael, Aaron Stump, Roberto Virga. Journal of Automated Reasoning, Volume 31, 2003, pages 231-260.

Papers Currently Under Review for Print Journals

Solving POPLMark in the Calculus of Nominal Inductive Constructions. *** Evan Austin, Aaron Stump, and Edwin Westbrook. Submitted to the Journal of Automated Reasoning, special issue on the POPLmark Challenge. Under review as of September 25, 2009.

Publications in Electronic Journals

Proof Checking Technology for Satisfiability Modulo Theories. Aaron Stump. Electronic Notes in Theoretical Computer Science, Volume 228, 2009, Pages 121-133.

Signature Compilation for the Edinburgh Logical Framework. * Michael Zeller, Aaron Stump, and Morgan Deters. Electronic Notes in Theoretical Computer Science, Volume 196, 2008, Pages 129-135.

Imperative LF Meta-Programming. Aaron Stump. Electronic Notes in Theoretical Computer Science, Volume 199, 2008, Pages 149-159.

Mining Propositional Simplification Proofs for Small Validating Clauses. * Ian Wehrman and Aaron Stump. Electronic Notes in Theoretical Computer Science, Volume 144, Issue 2, 19 January 2006, Pages 79-91.

Validated Proof-Producing Decision Procedures. * Robert Klapper and Aaron Stump. Electronic Notes in Theoretical Computer Science, Volume 125, Issue 3, 18 July 2005, Pages 53-68.

Logical Semantics for the Rewriting Calculus *. Aaron Stump and Carsten Schürmann. Electronic Notes in Theoretical Computer Science, Volume 125, Issue 2, 15 March 2005, Pages 149-164.

From Rogue to MicroRogue. * Aaron Stump, Ryan Besand, James C. Brodman, Jonathan Hseu and Bill Kinnersley. Electronic Notes in Theoretical Computer Science, Volume 117, 20 January 2005, Pages 69-87.

Producing Proofs from an Arithmetic Decision Procedure in Elliptical LF. * Aaron Stump, Clark W. Barrett and David L. Dill. Electronic Notes in Theoretical Computer Science, Volume 70, Issue 2, December 2002, Pages 29-41.

Conference Publications

Slothrop: Knuth-Bendix Completion with a Modern Termination Checker. * Ian Wehrman, Aaron Stump, Edwin Westbrook. The 17th International Conference on Rewriting Techniques and Applications (RTA), 2006, pages 287-296.

Programming with Proofs: Language-Based Approaches to Totally Correct Software. Aaron Stump. Invited position paper, IFIP working group conference on “Verified Software: Theories, Tools, Experiments” (VSTTE), 2006, 9 pages, published online.

Roadmap for Enhanced Languages and Methods to Aid Verification [30]. *** Gary T. Leavens, Jean-Raymond Abrial, Don Batory, Michael Butler, Alessandro Coglio, Kathi Fisler, Eric Hehner, Cliff Jones, Dale Miller, Simon Peyton-Jones, Murali Sitaraman, Douglas R. Smith, and Aaron Stump. Generative Programming and Component Engineering, 5th International Conference, 2006, Pages 221-236.

A Language-based Approach to Functionally Correct Imperative Programming [42]. * Edwin Westbrook, Aaron Stump, Ian Wehrman. The 10th ACM SIGPLAN International Conference on Functional Programming (ICFP), 2005, pages 268-279.

SMT-COMP: Satisfiability Modulo Theories Competition [47]. *** Clark Barrett, Leonardo de Moura, Aaron Stump. The 17th International Conference on Computer-Aided Verification (CAV), 2005, pages 20-23.

The Algebra of Equality Proofs [15]. * Aaron Stump and Li-Yang Tan. The 16th International Conference on Rewriting Techniques and Applications (RTA), 2005, pages 469-483.

Subset Types and Partial Functions. Aaron Stump. The 19th International Conference on Automated Deduction (CADE), 2003, pages 151-165.

Foundational Proof Checkers with Small Witnesses [34]. ** Dinghao Wu, Andrew Appel, and Aaron Stump. Principles and Practice of Declarative Programming (PPDP), 2003, pages 264-274.

Faster Proof Checking in the Edinburgh Logical Framework [19]. * Aaron Stump, David L. Dill. The 18th International Conference on Automated Deduction (CADE), 2002, pages 392-407.

CVC: a Cooperating Validity Checker [184]. * Aaron Stump, Clark W. Barrett, David L. Dill. The 14th International Conference on Computer Aided Verification (CAV), 2002, pages 500-504.

Checking Satisfiability of First-Order Formulas by Incremental Translation to SAT [119]. ** Clark W. Barrett, David L. Dill, Aaron Stump. The 14th International Conference on Computer Aided Verification (CAV), 2002, pages 236-249.

A Decision Procedure for an Extensional Theory of Arrays [90]. * Aaron Stump, Clark W. Barrett, David L. Dill, Jeremy Levitt. The 16th IEEE Symposium on Logic in Computer Science (LICS), 2001, pages 29-37.

A Framework for Cooperating Decision Procedures [29]. **** Clark W. Barrett, David L. Dill, Aaron Stump. The 17th International Conference on Automated Deduction (CADE), 2000, pages 79-97.

Workshop Publications

The Calculus of Nominal Inductive Constructions. ** Edwin Westbrook, Aaron Stump, Evan Austin. Logical Frameworks and Meta-languages: Theory and Practice (LFMTP), 2009. Affiliated with the Conference on Automated Deduction (CADE). Archived under the Association of Computing Machinery (ACM) International Conference Proceeding Series, Pages 74-83.

Fast and Flexible Proof Checking for SMT. * Duckki Oe, Andrew Reynolds, and Aaron Stump. Satisfiability Modulo Theories (SMT) 2009. Affiliated with the Conference on Automated Deduction (CADE).

Deciding Joinability Modulo Ground Equations in Operational Type Theory. * Adam Petcher and Aaron Stump. Proof Search in Type Theories (PSTT), 2009. Affiliated with the Conference on Automated Deduction (CADE).

Verified Programming in Guru. * Aaron Stump, Morgan Deters, Adam Petcher, Todd Schiller, and Timothy Simpson. Programming Languages meets Program Verification (PLPV), 2009. Affiliated with Principles of Programming Languages (POPL).

Proof Checking Technology for Satisfiability Modulo Theories. Aaron Stump. Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP), 2008. Affiliated with Logic in Computer Science (LICS).

Towards an SMT Proof Format. * Aaron Stump, Duckki Oe. Satisfiability Modulo Theories (SMT), 2008. Affiliated with the Conference on Computer-Aided Verification (CAV).

A Signature Compiler for the Edinburgh LF. * Michael Zeller, Aaron Stump, and Morgan Deters. Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP), 2007. Affiliated with the Conference on Automated Deduction (CADE).

Property Types: Semantic Programming for Java. * Aaron Stump and Ian Wehrman. Foundations and Developments of Object-Oriented Languages (FOOL/WOOD), 2006. Affiliated with Principles of Programming Languages (POPL).

Validated Construction of Congruence Closures. Aaron Stump. Disproving Workshop, 2005. Affiliated with the Conference on Automated Deduction (CADE).

Imperative LF Meta-Programming [13]. Aaron Stump. The 4th International Workshop on Logical Frameworks and Meta-Languages (LFM), 2004. Affiliated with the International Joint Conference on Automated Reasoning (IJCAR).

Rogue Decision Procedures [10]. * Aaron Stump, Arumugam Deivanayagam, Spencer Kathol, Dylan Lingelbach, and Daniel Schobel. The 1st International Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR), 2003. Affiliated with the Conference on Automated Deduction (CADE).

A Trustworthy Proof Checker. ** Andrew W. Appel, Neophytos Michael, Aaron Stump, Roberto Virga. Joint session of the Foundations of Computer Security (FCS) and Verification (VERIFY) workshops, 2002. Affiliated with Logic in Computer Science (LICS).

A Generalization of Shostak's Method for Combining Decision Procedures [49]. **** Clark W. Barrett, David L. Dill, Aaron Stump. The 4th International Workshop on Frontiers of Combining Systems (FroCos), 2002.

Generating Proofs from a Decision Procedure [18]. * Aaron Stump, David L. Dill. Run-time Result Verification workshop, 1999. Affiliated with the Federated Logic Conference (FLoC).

Other Works

Verified Programming in Guru. Aaron Stump. Draft textbook, written for my Spring 2009 class 22c:196:003, "Verified Software Construction". 114 pages.

Checking Validities and Proofs with CVC and flea [11]. Aaron Stump. Doctoral dissertation, Stanford University, 2002.

FUNDING

Awarded Grants

NSF grant CCF-0910510, "SHF: Large: Collaborative Research: TRELLYS: Community-Based Design and Implementation of a Dependently Typed Programming Language". Start date September 1, 2009. 4 year collaborative grant with Tim Sheard (Portland State) and Stephanie Weirich (U. Pennsylvania). \$691,207 (Iowa portion).

NSF grant CCF-0914877, "SHF: Small: Collaborative Research: Flexible, Efficient, and Trustworthy Proof Checking for Satisfiability Modulo Theories", collaborative proposal with Clark Barrett (NYU) and Cesare Tinelli (U. Iowa). Start date August 1, 2009. 2 year grant. \$299,986 (Iowa portion).

NSF grant CCF-0448275, "CAREER: Semantic Programming". Start date August 1, 2005. 5 year grant, plus Research Experience for Undergraduates (REU) supplements. \$432,825.

NSF grant CNS-0551697, "CRI: Collaborative Research: SMT-LIB, A Common Library and Infrastructure for Satisfiability Modulo Theories". Start date August 1, 2006. 2 year collaborative grant with Cesare Tinelli (University of Iowa) and Clark Barrett (New York University). \$170,573.

Intel gift, "SMT-LIB Specification". Received 2005 and 2006. \$16,666.

Pending Grants

NSF proposal CNS-0958160, “Collaborative Research: CI-ADDO-NEW: *-EXEC: A Cross-Community Solver Execution Service”. Proposed start date March 1, 2010. Collaborative proposal for 4-year grant with Cesare Tinelli (University of Iowa) and Geoff Sutcliffe (University of Miami). \$1,865,900 (Iowa part).

INVITED TALKS

“Lightweight Verification with Dependent Types”. The International Verification Workshop (VERIFY), 2007, July 2007, Bremen Germany. 1 hour presentation.

SERVICE

Leadership Positions

Associate Editor, ACM SIGPLAN Transactions on Programming Languages and Systems (TOPLAS), 2007 to present.

Trustee, the Conference on Automated Deduction (CADE), 2006-2009, nominated for re-election in 2009.

Workshop Chair International Joint Conference on Automated Reasoning (IJCAR), 2010.

Workshop Chair, International Conference on Automated Deduction (CADE), 2009.

External Judge, International SAT Competition, 2009. Three invited judges make decisions about the format and execution of this solver competition.

Steering Committee Co-Chair, Programming Languages meets Program Verification (PLPV), 2008 to the present, with Hongwei Xi (Boston University).

Co-Organizer, Satisfiability Modulo Theories Competition (SMT-COMP), 2005 to present, with Clark Barrett (2005 to present, New York University), Leonardo de Moura (2005-2006, Microsoft Research), Albert Oliveras (2007 to present, Technical University of Catalonia), and Morgan Deters (2008 to present, Technical University of Catalonia). Affiliated with the Conference on Computer Aided Verification (CAV) in 2005-2008 and 2010; and with the Conference on Automated Deduction in 2009.

Co-Organizer, Midwest Verification Day (MVD), 2009, with Cesare Tinelli (University of Iowa). 40 registered attendees from 11 research institutions in the Midwest.

Program Co-Chair, Programming Languages meets Program Verification (PLPV), 2006-2007, with Hongwei Xi (Boston University). Affiliated in 2006 with the International Joint Conference on Automated Reasoning (IJCAR). Affiliated in 2007 with the International Conference on Functional Programming (ICFP).

Guest Editor, Electronic Notes in Theoretical Computer Science, volume 174, number 7, 2007, with Hongwei Xi (Boston University). Special issue for the Proceedings of Programming Languages meets Program Verification (PLPV) 2006.

Program Committees

2010. The 5th International Joint Conference on Automated Reasoning (IJCAR); the 3rd International Conference on Verified Software: Theories, Tools, and Experiments (VSTTE).

2009. The 22nd International Conference on Automated Deduction (CADE).

2008. The 19th International Conference on Rewriting Techniques and Applications (RTA); the 1st Workshop on Satisfiability Modulo Theories (SMT), formerly PDPAR.

2007. The 18th International Conference on Rewriting Techniques and Applications (RTA).

2006. The 3rd International Joint Conference on Automated Reasoning (IJCAR); the 4th International Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR).

2005. The 20th International Conference on Automated Deduction (CADE); the 3rd International Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR).

2004. The 5th International Workshop on Strategies in Automated Deduction (STRATEGIES); the 2nd International Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR).

2003. The 1st International Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR).

Departmental Service

Doctoral Program Committee Member, Dept. of Computer Science and Engineering, Washington University in St. Louis. January 2004 to June 2008.

Student Advisory Board Faculty Facilitator, Dept. of Computer Science and Engineering, Washington University in St. Louis. August 2005 to June 2008.

College Service

Departmental Representative, Faculty Assembly, College of Liberal Arts and Sciences, The University of Iowa, Fall 2008 to present.

Academic Standards Committee Member, School of Engineering and Applied Sciences, Washington University in St. Louis. January 2006 to June 2008.

University Service

Assistant Professors' Forum Co-Organizer, Washington University in St. Louis. Two-year term, August 2005 to May 2007.

Community Service

Vice President, Willow Creek Condo Association, Iowa City, Iowa. 2008 to present.