

Curriculum Vitae

Aaron D. Stump

Current as of November 30, 2023

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EDUCATION AND PROFESSIONAL HISTORY

Higher Education

Stanford University, Department of Computer Science. Ph.D., August 2002.

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

Academic Positions

Professor of Computer Science, May 2014 to present, The University of Iowa.

Associate Professor of Computer Science, July 2008 to May 2014, The University of Iowa.

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

Honors and Awards

2021 Computer-Aided Verification (CAV) award, “For pioneering contributions to the foundations of the theory and practice of satisfiability modulo theories (SMT)”, with twenty others.

2021 Logic in Computer Science (LICS) Test of Time award for the 2001 paper “A Decision Procedure for an Extensional Theory of Arrays”.

2015 Collegiate Teaching Award, The College of Liberal Arts and Sciences (CLAS), The University of Iowa.

Best paper award, 2011, The 22nd International Conference on Term Rewriting and Applications (RTA), Novi Sad, Serbia, for “Type Preservation as a Confluence Problem”.

Haifa Verification Conference Award, 2010, with co-awardees Clark Barrett, Leonardo da Moura, Silvio Ranise, and Cesare Tinelli. “The HVC Award recognizes the most promising contribution to fields of software and hardware verification and test in the last five years.”

National Science Foundation CAREER award, August 1, 2005 - July 31, 2010.

Computer Science Prize for Academic Excellence, Computer Science Department, Cornell University. Undergraduate student award, 1997.

Memberships

IFIP Working Group 1.6 on Term Rewriting, invited member 2013-2017.

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

SCHOLARSHIP

A few notes for the following:

- My h-index according to Google Scholar as of November, 2023, is 27.
- Internet searches may turn up papers co-authored by another Aaron D. Stump in materials engineering.

Books

1. **Verified Functional Programming in Agda.**

Aaron Stump. ACM Books published by Morgan and Claypool, 2016, 283 pages. ISBN 9781970001242.

2. **Programming Language Foundations.**

Aaron Stump. Wiley, September, 2013, paperback, 336 pages. ISBN 9781118007471.

Publications in Print Journals (including PACMPL)

1. **Dual Counterpart Intuitionistic Logic.**

Anthony Cantor and Aaron Stump. Journal of Logic and Computation, published September, 2023, 43 pages.

2. **A Type-Based Approach to Divide-and-Conquer Recursion in Coq.**

Pedro Abreu, Benjamin Delaware, Alex Hubers, Christa Jenkins, J. Garrett Morris, Aaron Stump. Proceedings of the ACM on Programming Languages (PACMPL), volume 7, number POPL, January 2023, pages 61-90, 2023.

3. **Monotone recursive types and recursive data representations in Cedille.**

Christopher Jenkins and Aaron Stump. Mathematical Structures in Computer Science (MSCS), volume 31, number 6, pages 682-745, 2021.

4. **Strong functional pearl: Harper's regular-expression matcher in Cedille.**

Aaron Stump, Christopher Jenkins, Stephan Spahn, and Colin McDonald. Proceedings of the ACM on Programming Languages (PACMPL), volume 2, number ICFP (International Conference on Functional Programming), pages 122:1 - 122:25, 2020.

5. **Generic zero-cost reuse for dependent types.**

Larry Diehl, Denis Firsov, and Aaron Stump. Proceedings of the ACM on Programming Languages (PACMPL), volume 2, number ICFP (International Conference on Functional Programming), pages 104:1-104:30, 2018.

6. **From Realizability to Induction via Dependent Intersection.**

Aaron Stump. Annals of Pure and Applied Logic, volume 169, number 7, pages 637-655, 2018.

7. **The Calculus of Dependent Lambda Eliminations.**

Aaron Stump. Journal of Functional Programming, volume 27, e14, 2017.

8. **Efficiency of Lambda-Encodings in Total Type Theory.**
Aaron Stump and Peng Fu. *Journal of Functional Programming*, volume 26, e3, 2016.
9. **A lazy approach to adaptive exact real arithmetic using floating-point operations.**
Ryan McCleary, Martin Brain, and Aaron Stump. *ACM Communications on Computer Algebra*, volume 49, number 3, pages 83-86, 2015.
10. **The 2013 Evaluation of SMT-COMP and SMT-LIB.**
David R. Cok, Aaron Stump, and Tjark Weber. *Journal of Automated Reasoning*, volume 55, number 1, pages 61-90, 2015.
11. **6 Years of SMT-COMP.**
Clark Barrett, Morgan Deters, Leonardo de Moura, Albert Oliveras, Aaron Stump. *Journal of Automated Reasoning*, volume 50, number 3, pages 243-277, 2013.
12. **Equational Reasoning about Programs with General Recursion and Call-by-value Semantics.**
Garrin Kimmell, Aaron Stump, Harley D. Eades III, Peng Fu, Tim Sheard, Stephanie Weirich, Chris Casinghino, Vilhelm Sjöberg, Nathan Collins, Ki Yung Ahn. *Progress in Informatics*, No. 10, March 2013, pages 19-46. Journal version of PLPV '12 paper.
13. **SMT Proof Checking Using a Logical Framework.**
Aaron Stump, Duckki Oe, Andrew Reynolds, Liana Hadarean, and Cesare Tinelli. *Formal Methods in System Design*, volume 42, number 1, pages 91-118, 2013.
14. **Directly Reflective Meta-Programming.**
Aaron Stump. *The Journal of Higher Order and Symbolic Computation*, volume 22, number 2, pages 115-144, 2009.
15. **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.
16. **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.
17. **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.
18. **Design and Results of the 1st Satisfiability Modulo Theories Competition (SMT-COMP 2005).**
Clark Barrett, Leonardo de Moura, and Aaron Stump. *Journal of Automated Reasoning*, volume 35, 2006, pages 373-390.
19. **A Trustworthy Proof Checker.**
Andrew W. Appel, Neophytos Michael, Aaron Stump, Roberto Virga. *Journal of Automated Reasoning*, volume 31, 2003, pages 231-260.

Conference Publications

Note: Starting in 2017, proceedings of certain ACM SIGPLAN conferences have been published as issues of the journal Proceedings of the ACM on Programming Languages (PACMPL). Papers in these proceedings are accordingly listed in the section for journal papers, starting in 2017, rather than under conferences.

1. **Impredicative Encodings of Inductive-Inductive Data in Cedille.**

Andrew Marmaduke, Larry Diehl, and Aaron Stump. Received best student paper award. Trends in Functional Programming (TFP), LNCS volume 13868, pages 1-15. 2023.

2. **Simulating Large Eliminations in Cedille.**

Christa Jenkins, Andrew Marmaduke, and Aaron Stump. 27th International Conference on Types for Proofs and Programs (TYPES), pages 9:1-9:22, 2021.

3. **Zero-Cost Constructor Subtyping.**

Andrew Marmaduke, Christopher Jenkins, and Aaron Stump. Implementation of Functional Languages (IFL), pages 93-103, 2020.

4. **Quotients by Idempotent Functions in Cedille.**

Andrew Marmaduke, Christopher Jenkins, and Aaron Stump. Trends in Functional Programming (TFP), pages 1-20, 2019.

5. **Spine-local Type Inference.**

Chris Jenkins and Aaron Stump. 30th Symposium on Implementation of Functional Languages (IFL), pages 37-48, 2018.

6. **Efficient Mendler-Style Lambda-Encodings in Cedille.**

Denis Firsov, Richard Blair, and Aaron Stump. 9th International Conference on Interactive Theorem Proving (ITP), pages 235-252, 2018.

7. **Generic Derivation of Induction for Impredicative Encodings in Cedille.**

Denis Firsov and Aaron Stump. 7th ACM SIGPLAN International Conference on Certified Programs and Proofs (CPP), pages 215-227, 2018.

8. **StarExec: A Cross-Community Infrastructure for Logic Solving.**

Aaron Stump, Geoff Sutcliffe, and Cesare Tinelli. 7th International Joint Conference on Automated Reasoning (IJCAR), pages 367-373, 2014.

9. **Self Types for Dependently Typed Lambda Encodings.**

Peng Fu and Aaron Stump. Rewriting Techniques and Applications/Typed Lambda Calculi and Applications (RTA-TLCA), pages 224-239, 2014.

10. **versat: A Verified Modern SAT Solver.**

Duckki Oe, Aaron Stump, Corey Oliver, and Kevin Clancy. Verification, Model Checking, and Abstract Interpretation (VMCAI), pages 363-378, 2012.

11. **Type Preservation as a Confluence Problem.**

Aaron Stump, Garrin Kimmell, and Ruba El Haj Omar. The 22nd International Conference on Rewriting Techniques and Applications (RTA), 2011, pages 345-360. This paper received the (sole) best paper award at RTA 2011.

12. **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.
13. **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.
14. **Roadmap for Enhanced Languages and Methods to Aid Verification.**
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.
15. **A Language-based Approach to Functionally Correct Imperative Programming.**
Edwin Westbrook, Aaron Stump, Ian Wehrman. The 10th ACM SIGPLAN International Conference on Functional Programming (ICFP), 2005, pages 268-279.
16. **SMT-COMP: Satisfiability Modulo Theories Competition.**
Clark Barrett, Leonardo de Moura, Aaron Stump. The 17th International Conference on Computer-Aided Verification (CAV), 2005, pages 20-23.
17. **The Algebra of Equality Proofs.**
Aaron Stump and Li-Yang Tan. The 16th International Conference on Rewriting Techniques and Applications (RTA), 2005, pages 469-483.
18. **Subset Types and Partial Functions.**
Aaron Stump. The 19th International Conference on Automated Deduction (CADE), 2003, pages 151-165.
19. **Foundational Proof Checkers with Small Witnesses.**
Dinghao Wu, Andrew Appel, and Aaron Stump. Principles and Practice of Declarative Programming (PPDP), 2003, pages 264-274.
20. **Faster Proof Checking in the Edinburgh Logical Framework.**
Aaron Stump, David L. Dill. The 18th International Conference on Automated Deduction (CADE), 2002, pages 392-407.
21. **CVC: a Cooperating Validity Checker.**
Aaron Stump, Clark W. Barrett, David L. Dill. The 14th International Conference on Computer Aided Verification (CAV), 2002, pages 500-504.
22. **Checking Satisfiability of First-Order Formulas by Incremental Translation to SAT.**
Clark W. Barrett, David L. Dill, Aaron Stump. The 14th International Conference on Computer Aided Verification (CAV), 2002, pages 236-249.
23. **A Decision Procedure for an Extensional Theory of Arrays.**
Aaron Stump, Clark W. Barrett, David L. Dill, Jeremy Levitt. The 16th IEEE Symposium on Logic in Computer Science (LICS), 2001, pages 29-37. Honored with Test of Time award in 2021.

24. A Framework for Cooperating Decision Procedures.

Clark W. Barrett, David L. Dill, Aaron Stump. The 17th International Conference on Automated Deduction (CADE), 2000, pages 79-97.

Publications in Electronic Journals

1. A Weakly Initial Algebra for Higher-Order Abstract Syntax in Cedille.

Aaron Stump. Electronic Proceedings in Theoretical Computer Science (EPTCS), pages 54-66, 2019.

2. Dualized Simple Type Theory.

Harley Eades III, Aaron Stump, and Ryan McCleary. Logical Methods in Computer Science (LMCS), volume 12, number 3, 2016, pages 1-47.

3. Hereditary Substitution for the $\lambda\Delta$ -calculus.

Harley Eades III and Aaron Stump. Electronic Proceedings in Theoretical Computer Science, volume 127, 2013, pages 45-65.

4. A Rewriting View of Simple Typing.

Aaron Stump, Hans Zantema, Garrin Kimmell, Ruba El Haj Omar. Logical Methods in Computer Science (LMCS), volume 9, number 1, 2012.

5. Termination Casts: A Flexible Approach to Termination with General Recursion.

Aaron Stump, Vilhelm Sjöberg, Stephanie Weirich. Electronic Proceedings in Theoretical Computer Science, volume 43, 2010, pages 76-93.

6. Equality, Quasi-Implicit Products, and Large Eliminations.

Vilhelm Sjöberg, Aaron Stump. Electronic Proceedings in Theoretical Computer Science, volume 45, 2010, pages 90-100.

7. Proof Checking Technology for Satisfiability Modulo Theories.

Aaron Stump. Electronic Notes in Theoretical Computer Science, volume 228, 2009, Pages 121-133.

8. 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.

9. Imperative LF Meta-Programming.

Aaron Stump. Electronic Notes in Theoretical Computer Science, volume 199, 2008, Pages 149-159.

10. 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.

11. 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.

12. 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.

13. 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.

14. 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.

Workshop Publications

Note: Some papers originally presented at workshops have also been archived in revised form in electronic journals, following a second round of reviewing. Such papers are noted both under workshops and under electronic journals.

1. Efficient lambda encodings for Mendler-style coinductive types in Cedille.

Christopher Jenkins, Aaron Stump, Larry Diehl. Mathematically Structured Functional Programming, pages 72-97, 2020.

2. A Weakly Initial Algebra for Higher-Order Abstract Syntax in Cedille.

Aaron Stump. International Workshop on Logical Frameworks and Meta-languages: Theory and Practice (LFMTP), affiliated with the IEEE Symposium on Logic in Computer Science (LICS), 2019.

3. The recursive polarized dual calculus.

Aaron Stump. The 2014 ACM SIGPLAN Workshop on Programming Languages meets Program Verification (PLPV), pages 3-14, 2014.

4. Hereditary Substitution for the $\lambda\Delta$ -calculus.

Harley Eades III and Aaron Stump. International Workshop on Control Operators and their Semantics (COS), affiliated with the 11th International Conference on Typed Lambda Calculus and Applications (TLCA), 2013.

5. Extended Abstract: Reconsidering Intuitionistic Duality.

Aaron Stump, Harley Eades III, Ryan McCleary. International Workshop on Control Operators and their Semantics (COS), affiliated with the 11th International Conference on Typed Lambda Calculus and Applications (TLCA), 2013.

6. The 2nd Verified Software Competition: Experience Report.

Jean-Christophe Filliatre, Andrei Paskevich, and Aaron Stump. 1st International Workshop on Comparative Empirical Evaluation of Reasoning Systems (COMPARE), affiliated with the International Joint Conference on Automated Reasoning (IJCAR), 2012.

7. Irrelevance, Heterogeneous Equality, and Call-by-value Dependent Type Systems.

Vilhelm Sjoeberg, Chris Casinghino, Ki Yung Ahn, Nathan Collins, Harley D. Eades III, Peng Fu, Garin Kimmell, Tim Sheard, Aaron Stump, Stephanie Weirich. Mathematically Structured Functional Programming (MSFP), pages 112-162, 2012.

8. Towards typing for small-step direct reflection.

Jacques Carette, Aaron Stump. Partial Evaluation and Program Manipulation (PEPM). Affiliated with ACM Principles of Programming Languages (POPL). Archived in the ACM Digital Library, pages 93-96, 2012.

9. **Equational reasoning about programs with general recursion and call-by-value semantics.**
Garrin Kimmell, Aaron Stump, Harley D. Eades III, Peng Fu, Tim Sheard, Stephanie Weirich, Chris Casinghino, Vilhelm Sjöberg, Nathan Collins, Ki Yung Ahn. Programming Languages meets Program Verification (PLPV). Affiliated with ACM Principles of Programming Languages (POPL). Archived in the ACM Digital Library, pages 15-26, 2012.
10. **A Framework for Internalizing Relations into Type Theory.**
Peng Fu, Aaron Stump, and Jeff Vaughan. Workshop on Proof Search in Axiomatic Theories and Type Theories (PSATTT), 2011; affiliated with the International Conference on Automated Deduction (CADE).
11. **Extended Abstract: Combining a Logical Framework with an RUP Checker for SMT Proofs.**
Duckki Oe and Aaron Stump. International Workshop on Satisfiability Modulo Theories (SMT), 2011.
12. **Language-Based Verification Will Change the World.**
Tim Sheard, Aaron Stump, Stephanie Weirich. Future of Software Engineering Research (FoSER), 2010. Affiliated with ACM Foundations of Software Engineering (FSE). Archived in the ACM Digital Library, pages 343-348.
13. **Comparing Proof Systems for Linear Real Arithmetic with LFSC.**
Andrew Reynolds, Liana Haderean, Cesare Tinelli, Yeting Ge, Aaron Stump, Clark Barrett. The Workshop on Satisfiability Modulo Theories (SMT), 2010. Affiliated with the International Conference on Computer-Aided Verification (CAV) and the International Conference on Theory and Applications of Satisfiability Testing (SAT).
14. **The SMT-LIB Standard – Version 2.0.**
Clark Barrett, Aaron Stump, Cesare Tinelli. The Workshop on Satisfiability Modulo Theories (SMT), 2010. Affiliated with the International Conference on Computer-Aided Verification (CAV) and the International Conference on Theory and Applications of Satisfiability Testing (SAT).
15. **Hereditary Substitution for Stratified System F.**
Harley Eades III, Aaron Stump. Workshop on Proof Search in Type Theory (PSTT), 2010. Affiliated with the IEEE Symposium on Logic in Computer Science (LICS).
16. **Exploring Predictability of SAT/SMT Solvers.**
Robert Brummayer, Duckki Oe, and Aaron Stump. Workshop on Evaluation Methods for Solvers, Quality Metrics for Solutions (EMSQMS), 2010. Affiliated with the International Joint Conference on Automated Reasoning (IJCAR).
17. **Termination Casts: A Flexible Approach to Termination with General Recursion.**
Aaron Stump, Vilhelm Sjöberg, Stephanie Weirich. Proceedings Workshop on Partiality and Recursion in Interactive Theorem Provers (PAR), 2010. Affiliated with the International Joint Conference on Automated Reasoning (IJCAR).
18. **Equality, Quasi-Implicit Products, and Large Eliminations.**
Vilhelm Sjöberg, Aaron Stump. Fifth Workshop on Intersection Types and Related Systems (ITRS), 2010. Affiliated with the IEEE Symposium on Logic in Computer Science (LICS).
19. **Resource Typing in Guru.**
Aaron Stump, Evan Austin. Programming Languages meets Program Verification, 2010. Affiliated with ACM Principles of Programming Languages (POPL). Archived in the ACM Digital Library, pages 27-38.

20. **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 ACM International Conference Proceeding Series, pages 74-83.
21. **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).
22. **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).
23. **Verified Programming in Guru.**
Aaron Stump, Morgan Deters, Adam Petcher, Todd Schiller, and Timothy Simpson. Programming Languages meets Program Verification (PLPV), 2009. Affiliated with ACM Principles of Programming Languages (POPL). Archived in the ACM Digital Library, pages 49-58.
24. **Proof Checking Technology for Satisfiability Modulo Theories.**
Aaron Stump. Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP), 2008. Affiliated with the IEEE Symposium on Logic in Computer Science (LICS).
25. **Towards an SMT Proof Format.**
Aaron Stump, Duckki Oe. Satisfiability Modulo Theories (SMT), 2008. Affiliated with the Conference on Computer-Aided Verification (CAV).
26. **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).
27. **Property Types: Semantic Programming for Java.**
Aaron Stump and Ian Wehrman. Foundations and Developments of Object-Oriented Languages (FOOL/WOOD), 2006. Affiliated with ACM Principles of Programming Languages (POPL).
28. **Validated Construction of Congruence Closures.**
Aaron Stump. Disproving Workshop, 2005. Affiliated with the Conference on Automated Deduction (CADE).
29. **Imperative LF Meta-Programming.**
Aaron Stump. The 4th International Workshop on Logical Frameworks and Meta-Languages (LFM), 2004. Affiliated with the International Joint Conference on Automated Reasoning (IJCAR).
30. **Rogue Decision Procedures.**
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).
31. **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 the IEEE Symposium on Logic in Computer Science (LICS).

32. **A Generalization of Shostak’s Method for Combining Decision Procedures.**

Clark W. Barrett, David L. Dill, Aaron Stump. The 4th International Workshop on Frontiers of Combining Systems (FroCos), 2002.

33. **Generating Proofs from a Decision Procedure.**

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. Available from the publications section of my web page.

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

INVITED TALKS

“From inductive lambda-encodings to divide-and-conquer recursion”. Invited talk at the Principles of Programming and Verification (POPV) seminar at Boston University. April 12, 2022. 1 hour presentation.

“Rediscovering Constructive Type Theory with Cedille”. Invited talk at the Syntax and Semantics of Low-Level Languages (LOLA) workshop, affiliated with LICS 2019. June 23, 2019. 1 hour presentation.

“Marvels of Extrinsic Type Theory”. Distinguished Lecture Series, Computer Science, Northwestern University, October 20, 2017. 1 hour presentation.

“From Impredicativity to Induction in Dependent Type Theory”. Logic seminar, Indiana University, February 22, 2016. 1 hour presentation.

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

FUNDING

Awarded Grants

1. **Ethereum Foundation gift, “Cedille Support for Ethereum”**
\$50,194, 2019.
2. **NSF CNS-1729603, “Collaborative Research: CI-SUSTAIN: StarExec: Cross-Community Infrastructure for Logic Solving”**
PI on collaborative proposal with Cesare Tinelli (University of Iowa) and Geoff Sutcliffe (University of Miami). September 1, 2017 through November 30, 2022. \$610,641 (Iowa part).
3. **AFOSR 14944300 (MURI program), “Semantics, Formal Reasoning, and Tool Support for Quantum Programming”**
PI on collaborative multi-institution proposal, led by Tulane University. December 1, 2015 through November 30, 2020. \$1,007,034.00 (Iowa part).
4. **NSF CSF-1524519, “Lambda Encodings Reborn”**
August 1, 2015 through July 31, 2019. \$468,938 (Iowa part).
5. **NSF CNS-1058748, “Collaborative Research: CI-ADDO-NEW: StarExec: Cross-Community Infrastructure for Logic Solving”.**
PI on collaborative proposal with Cesare Tinelli (University of Iowa) and Geoff Sutcliffe (University of Miami). September 1, 2011 through August 31, 2015. \$1,907,270 (Iowa part).
6. **NSF CCF-1250306, “Powerful User Interfaces for Interactive Theorem Proving”**
Co-PI on proposal with PI Juan Pablo Hourcade (University of Iowa). September 1, 2012 through August 31, 2014. \$99,791 (total award).
7. **NSF CCF-1049597, “Midwest Verification Day”**
Collaborative proposal with Cesare Tinelli (University of Iowa). Participant travel costs for the Second Midwest Verification Day, September 2010. \$5,250.
8. **NSF CNS-0958160, “Collaborative Research: CI-ADDO-NEW: *-EXEC: A Cross-Community Solver Execution Service”**
Planning grant for collaborative proposal with Cesare Tinelli (University of Iowa) and Geoff Sutcliffe (University of Miami). May 1, 2010 through April 30, 2011. \$84,197 (Iowa part).
9. **NSF CCF-0910510, “SHF: Large: Collaborative Research: TRELLYS: Community-Based Design and Implementation of a Dependently Typed Programming Language”**
September 1, 2009 through 2014. PI on collaborative grant with Tim Sheard (Portland State) and Stephanie Weirich (U. Pennsylvania). \$691,207 (Iowa portion) plus \$15,700.00 Research Experience for Undergraduates (REU) supplement.
10. **NSF CCF-0914877, “SHF: Small: Collaborative Research: Flexible, Efficient, and Trustworthy Proof Checking for Satisfiability Modulo Theories”**
PI on collaborative proposal with Clark Barrett (NYU) and Cesare Tinelli (U. Iowa). August 1, 2009 through July 31, 2011. \$299,986 (Iowa portion).

11. **NSF CCF-0448275, “CAREER: Semantic Programming”**
August 1, 2005 through July 31, 2011. \$400,000 plus \$32,825 Research Experience for Undergraduates (REU) supplements.
12. **NSF CNS-0551697, “CRI: Collaborative Research: SMT-LIB, A Common Library and Infrastructure for Satisfiability Modulo Theories”**
August 1, 2006 through July 31, 2008. PI (while at Washington University in St. Louis) on collaborative grant with Cesare Tinelli (University of Iowa) and Clark Barrett (New York University). \$170,573 (Wash. U. portion).
13. **Intel gift, “SMT-LIB Specification”**
Received 2005 and 2006. \$16,666.

SERVICE

Infrastructure

Project leader for the StarExec web service (www.starexec.org). The service provides compute resources (around 250 nodes) for members of subcommunities of Automated Reasoning for evaluating logic solvers on benchmarks. Since its inception in 2013, it has been used to run just under 75 events for around a dozen different subfields. It has over 1000 registered users. Typical usage is between 300,000 and 1,000,000 solver invocations per week.

Outreach

Creator and host for the Iowa Type Theory Commute, a podcast running since November, 2019. 160 podcast episodes have been recorded, with total downloads over 63,000. The target audience is industrial programmers interested in learning more about research in this area.

Industrial

Technical advisor, Higher Order Company, a startup based a new approach to massive parallelization, 2023 to present.

Technical advisor, Sunshine Cybernetics Inc., a crypto-currency startup, 2019-2021.

Program Committees

Conferences are listed by year in which the conference was (or is to be) held.

2023. ACM Principles of Programming Languages (POPL); ACM Certified Programs and Proofs (CPP); The Workshop on Type-Driven Development (TyDe).

2022. Trends in Functional Programming (TFP).

2021. Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP)

2020. ACM Principles of Programming Languages (POPL); Formal Structures for Computation and Deduction (FSCD). External review committee for ACM International Conference on Functional Programming (ICFP).

2019. Formal Structures for Computation and Deduction (FSCD).

2017. Formal Structures for Computation and Deduction (FSCD).

2013. International Conference on Rewriting Techniques and Applications (RTA); International Workshop on Proof Exchange for Theorem Provers (PxTP).

2012. International Joint Conference on Automated Reasoning (IJCAR); International Workshop on Proof Exchange for Theorem Provers (PxTP); International Workshop on Comparative Empirical Evaluation of Reasoning Systems (COMPARE).

2011. International Conference on Automated Deduction (CADE).

2010. International Joint Conference on Automated Reasoning (IJCAR); International Conference on Verified Software: Theories, Tools, and Experiments (VSTTE).

2009. International Conference on Automated Deduction (CADE).

2008. International Conference on Rewriting Techniques and Applications (RTA); Workshop on Satisfiability Modulo Theories (SMT), formerly PDPAR.

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

2006. International Joint Conference on Automated Reasoning (IJCAR); International Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR).

2005. International Conference on Automated Deduction (CADE); International Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR).

2004. Workshop on Strategies in Automated Deduction (STRATEGIES); Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR).

2003. Workshop on Pragmatics of Decision Procedures in Automated Reasoning (PDPAR).

External Doctoral Dissertations

Reviewer, Gabriel Hondet, ENS Paris-Saclay, France, defended September 2022.

Committee member, Vilhelm Sjöberg, The University of Pennsylvania, defended December, 2014.

Committee member, Chris Casinghino, The University of Pennsylvania, defended August, 2014.

External reviewer, Sarah Winkler, University of Innsbruck, March, 2013.

Committee member, Dinghao Wu, Princeton University, 2005.

Other Professional

Member, Skolem Award committee for the International Conference on Automated Deduction (CADE), 2017, charged with selecting most influential papers from earlier editions of the conference.

Steering Committee Member, the International Conference on Rewriting Techniques and Applications (RTA), elected 2013 to 3-year term.

Organizer, U. Iowa Mini-Symposium on Programming Languages, October 10-11, 2013. See <http://www.cs.uiowa.edu/~astump/minisym-oct-2013.html> for the program.

Organizer, U. Iowa Mini-Symposium on Computational Logic, May 21-24, 2013. See <http://www.cs.uiowa.edu/~astump/minisym-may-2013.html> for the program.

Co-Organizer, with Geoff Sutcliffe and Cesare Tinelli, of the StarExec Workshop series, 2012-2013. Affiliated in 2012 with the International Joint Conference on Automated Reasoning (IJCAR). Affiliated in 2013 with the Conference on Automated Deduction (CADE).

Co-Organizer, with Jean-Christophe Filliâtre and Andrei Paskevich, 2nd Verified Software Competition, affiliated with the “Verified Software: Theories, Tools, and Experiments” (VSTTE) conference, 2011.

Program Committee Co-Chair, with Pascal Fontaine, First International Workshop on Proof Exchange for Theorem Provers (PxTP), affiliated with the Conference on Automated Deduction (CADE), 2011.

Associate Editor, ACM SIGPLAN Transactions on Programming Languages and Systems (TOPLAS), 2007-2011.

Program Committee Co-Chair, with Deborah McGuinness, Geoff Sutcliffe, Cesare Tinelli, First International Workshop on Evaluation Methods for Solvers, Quality Metrics for Solutions (EMSQMS), affiliated with the International Joint Conference on Automated Reasoning (IJCAR), 2010.

Workshop Chair, International Conference on Automated Deduction (CADE), 2011.

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

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

Trustee, the Conference on Automated Deduction (CADE), 2006-2009.

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

Steering Committee Member, Programming Languages meets Program Verification (PLPV) workshop, 2011-2014.

Steering Committee Co-Chair, Programming Languages meets Program Verification (PLPV) workshop, 2008-2011, with Hongwei Xi (Boston University).

Co-coordinator, SMT-LIB (Satisfiability Modulo Theories Library) initiative, with Cesare Tinelli and Clark Barrett, 2009-2013.

Co-Organizer, Satisfiability Modulo Theories Competition (SMT-COMP), 2005-2010, with Clark Barrett (2005-2010, New York University), Leonardo de Moura (2005-2006, Microsoft Research), Albert Oliveras (2007-2010, Technical University of Catalonia), and Morgan Deters (2008 to 2010, 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 and 2010, with Cesare Tinelli (University of Iowa), at The University of Iowa. In 2009: 40 registered attendees from 11 research institutions in the Midwest. In 2010: over 50 registered attendees from 13 institutions.

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.

University Service

University Committee on Conflict of Interest in Employment., The University of Iowa, 3-year term, 2017-2020.

Financial Aid Advisory Committee, The University of Iowa, 3-year term, 2010-2013.

Student Employee of the Year Selection Committee, The University of Iowa, Spring 2011.

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

College Service

Member, Teaching Award Committee, College of Liberal Arts and Sciences, The University of Iowa, Fall 2018 to Fall 2021.

Member, Scholarship Committee, College of Liberal Arts and Sciences, The University of Iowa, Fall 2012 to Fall 2015.

Member, Search Committee for a Senior Undergraduate Advisor for Chemistry, Math, and Computer Science, September-October 2011.

Internal member, Review Committee for the Department of Linguistics at the University of Iowa, October-November 2011.

Departmental Representative, Faculty Assembly, College of Liberal Arts and Sciences, The University of Iowa, Fall 2008 through Spring 2010.

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

Departmental Service

Graduate Program Committee Member, Dept. of Computer Science, The University of Iowa, 2018-2021, also 2010-2013. Jointly responsible for graduate admissions and special graduate programming (“Lunch and Learn”) series in the department.

Colloquium Organizer, Dept. of Computer Science, The University of Iowa, 2011-2013.

Faculty Recruiting Committee Member, Dept. of Computer Science, The University of Iowa, Spring 2011.

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.

MENTORING

Mentoring at The University of Iowa (2008-present)

Standing	Student Name	Years	Outcome
Asst. prof.	Omar Chowdhury	June 2015-June 2021	promotion and tenure
Postdoctoral	Stephan Spahn	June 2019-November 2020	Tallinn U. of Technology
Postdoctoral	Larry Diehl	June 2017-March 2019	Symbiont
Postdoctoral	Ernesto Copello	October 2017-September 2018	return to Universidad ORT, Uruguay
Postdoctoral	Denis Firsov	January 2017-December 2018	GuardTime, TalTech
Postdoctoral	Garrin Kimmell	Summer 2010-summer 2012	Computer Scientist, Kestrel Institute
Ph.D. student	Alex Hubers	Fall 2020-present	ongoing
	Andrew Marmaduke	Fall 2018-present	ongoing
	Anthony Cantor	Fall 2017-present	ongoing
	Chris Jenkins	Fall 2017-present	postdoc SUNY Stonybrook
	Richard Blair	Spring 2017-Spring 2018	left for job
	Ryan McCleary	Spring 2013-Summer 2019	Assistant prof., Grand View University
	Peng (Frank) Fu	2009-2014	postdoc at U. Dundee, Scotland
	Harley Eades III	2011-2014	Assistant prof., Georgia Regents U.
	Duckki Oe	2008-Summer 2012	postdoc with Adam Chlipala, MIT
	Andy Reynolds	2008-2009	switched advisors to Cesare Tinelli
Master's student	Ananda Guneratne	Spring 2013-Summer 2017	graduation and job
	Albert Giegerich	Spring 2016-Spring 2017	graduation and job
	Eric Burns	Fall 2014-Spring 2016	job at Google
	Cory Oliver	2011-2012	Software Engineer, Dwolla
	Eric Bavier	2011	graduation
	Austin Laugesen	2011-2012	Program Manager, Microsoft
	Ruoyu Zhang	2011-2012	PhD program, U. Iowa
	Bhargavi Krishnamachari	2011-2012	student status
	CJ Palmer	2011	job at Cerner
	Tyler Jensen	2011	Software Engineer, Microsoft
	Harley Eades III	2009-2011	PhD program, U. Iowa

Standing	Student Name	Years	Outcome
Undergraduate	Alex Guo	Summer 2023	student status
	Daniel Bodin	Summer 2023	student status
	Archie Kipp	Summer 2022 - Winter 2022	student status
	Preston Dodd	Summer 2022 - Spring 2023	student status
	Alex Brown	Spring 2020 - Summer 2021	Master's program
	Nadav Kohen	Fall 2017-Spring 2018	graduation and job
	Pat Hawks	Spring 2017-Summer 2019	graduation and job
	Douglas Ives	Spring 2016	student status
	Andrew Lubinus	Spring 2016-Summer 2016	graduation and job
	John Bodeen	Summer 2014-Summer 2015	doctoral student UCSB
	Albert Giegerich	Spring 2015-Fall 2015	Master's program
	Timothy Smith	Spring 2014	graduation and job
	Eric Burns	Spring 2013-Summer 2014	Master's program
	Wyatt Kaiser	Spring 2013-Spring 2014	graduation and job
	Angello Astorga	SROP program, Summer 2014	student status at Ohio State
	Todd Elvers	2011-2012	took job at CarFax
	Steven Pingel	Summer 2011	student status
	Hayley Abbas	Summer 2011	took job at Innovative Software Eng.
	Dolan Murphy	Summer 2011	student status
	Kevin Clancy	2011-2012	student status
	Austin Laugesen	Fall 2010-2011	Master's program, U. Iowa
	JJ Meyer	2010-2011	Master's program, Portland State
	Reece Blanco	Summer 2010	student status
Kyle Krchak	Summer 2010	student status	
John Hughes	2009-2010	student status	
Gregory Witt	2009-2010	Math PhD program, U. Iowa	

Mentoring at Washington University in St. Louis (2002-2008)

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

TEACHING

Teaching at The University of Iowa (2008-present)

SEMESTER	Course Number and Title	Enrollment
Fall 2023	CS:4330, "Theory of Computation"	32
Spring 2023	CS:3820, "Programming Language Concepts"	83
Fall 2022	CS:4330, "Theory of Computation"	45
Spring 2022	CS:3820, "Programming Language Concepts"	115
Fall 2021	CS:4330, "Theory of Computation"	29
Spring 2021	CS:3820, "Programming Language Concepts"	83
Fall 2020	CS:5860, "Lambda Calculus and Applications"	13
Spring 2020	CS:3820, "Programming Language Concepts"	83
Spring 2019	CS:5850, "Programming Language Foundations"	11
	CS:3820, "Programming Language Concepts"	56
Spring 2018	CS:5860, "Lambda Calculus and Applications"	10
	CS:3820, "Programming Language Concepts"	58
Fall 2017	CS:3820, "Programming Language Concepts"	51
Spring 2017	CS:3820, "Programming Language Concepts"	51
Fall 2016	CS:5850, "Programming Language Foundations"	15
Spring 2016	CS:4980:0005, "Topics in Computer Science: Lambda Calculus"	26
Fall 2015	CS:3820, "Programming Language Concepts"	57
Spring 2015	CS:3820, "Programming Language Concepts"	55
Fall 2014	HONR:1300:0034, "Honors First-Year Seminar: Critical Software: From Cyberwarfare to Computer-Checked Proofs"	14
	CS:5850, "Programming Language Foundations"	11

SEMESTER	Course Number and Title	Enrollment
Spring 2014	22C:111, "Programming Language Concepts"	81
Fall 2013	22C:185, "Programming Language Foundations"	11
Spring 2013	22C:111, "Programming Language Concepts"	88
	22C:399, "Research Seminar: Colloquium Series"	28
Fall 2012	22C:196:002, "Topics in Computer Science: Lambda Calculus and Applications"	10
	22C:399, "Research Seminar: Colloquium Series"	36
Spring 2012	22C:111, "Programming Language Concepts"	56
	22C:399, "Research Seminar: Colloquium Series"	34
Fall 2011	22C:002:003, "First-Year Seminar: Hidden Meanings : Cryptography and Codes, Puzzles and Parables"	16
	22C:185, "Programming Language Foundations"	11
	22C:399, "Research Seminar: Colloquium Series"	34
Spring 2011	22C:111, "Programming Language Concepts"	53
Fall 2010	22C:002:003, "First-Year Seminar: To Infinity and Beyond: Infinity in Math, Computer Science, Philosophy, and Art"	14
	22C:185, "Programming Language Foundations"	12
Spring 2010	22C:111, "Programming Language Concepts"	42
Fall 2009	22C:002, "First-Year Seminar: Inventing Languages: Computer Programs, Music Notation, Sports Plays, and Beyond"	13
	22C:185, "Programming Language Foundations"	12
Spring 2009	22C:196:003, "Topics in Computer Science: Verified Software Construction"	14
Fall 2008	22C:185, "Programming Language Foundations"	18

Special Lectures

- Lecture titled "From Logic with Love" in the College of Liberal Arts and Sciences, The University of Iowa, Master Class Fall 2015, organized by Prof. Judith Pascoe (English), on "What We Talk About When We Talk About Love".

Teaching at Washington University in St. Louis (2002-2008)

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

Teaching at Stanford University (2002)

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