CURRICULUM VITAE

Aaron David Stump

Computer Science

January 2017 – December 2022

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The University of Iowa
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Education and Professional History

Higher Education

2002 **Phd**, Computer Science, Stanford University
Thesis: Checking Validities and Proofs with CVC and flea

1997 **BS**, Computer Science, Philosophy, Cornell University

Professional and Academic Positions

2014 – present **Professor**, Department of Computer Science, The University of Iowa

2008 – 2014 **Associate Professor**, Department of Computer Science, The University of Iowa

2002 – 2008 **Assistant Professor**, Department of Computer Science and Engineering, Washington University in St. Louis

Honors and Awards

2021 **Test of Time award**, Logic in Computer Science (LICS) conference, for the 2001 paper "A Decision Procedure for an Extensional Theory of Arrays", with three coauthors.

2021 **Conference award**, Computer-Aided Verification (CAV), "for pioneering contributions to the foundations of the theory and practice of satisfiability modulo theories (SMT)," with twenty others.

Memberships

2004 – present Association for Computing Machinery (ACM)

Teaching

Courses Taught at the University of Iowa

Term	Course #	Title	Final Enroll.
Fall 2022	CS:4330:0001	Theory of Computation	45
Spring 2022	CS:3820:0001	Programming Language Concepts	115
Fall 2021	CS:4330:0001	Theory of Computation	29
Spring 2021	CS:3820:0001	Programming Language Concepts	83
Fall 2020	CS:5860:0001	Lambda Calculus and Applications	13
Spring 2020	CS:3820:0001	Programming Language Concepts	83
Spring 2019	CS:5850:0001	Programming Language Foundations	11
Spring 2019	CS:3820:0001	Programming Language Concepts	56

Student Mentoring Summary

Fall 2018 – Spring 2020 Undergraduate Advisor, # Students: 25/semester (approx.)
Fall 2020 – Spring 2021 MCS Advisor, # Students: 25 (approx.)
Fall 2021 – Spring 2022 # Students: 20 (approx.)
Fall 2022 – Spring 2023 # Students: 20 (approx.)

Student Mentoring

PhD — Advisor

Fall 2017 – present Jenkins, Christopher; final dissertation expected Spring 2023
Fall 2017 – present Cantor, Anthony; final dissertation expected Fall 2023
Fall 2018 – present Marmaduke, Andrew; dissertaton proposal expected Spring 2023
Fall 2019 – present Hubers, Alex; qualifying exam passed Spring 2022
Fall 2012 – Summer 2019 **Lazy Exact Real Arithmetic Using Floating Point Operations**, McCleeary, Ryan; successfully defended

PhD — Committee Member, External

2022 Hondet, Gabriel, ENS Paris-Saclay, France; successfully defended

PhD — Committee Member, U. Iowa

2019 – 2020 Inamdar, Tanmay; successfully defended
2019 – 2019 Riaz, Talal; succesfully defended
2018 – 2019 Meng, Baoluo; succesfully defended

Professional Mentoring

Assistant Professors

August 2016 – June 2022 Official faculty mentor for Omar Chowdhury

Postdoctoral Researchers

January 2017 – December 2018	Firsov, Denis
October 2017 – September 2018	Copello, Ernesto
June 2017 – March 2019	Diehl, Larry
June 2019 – November 2020	Spahn, Stephan

Scholarship

CLAS * System: * = major contribution *** = equal contribution
** = secondary contribution **** = minor contribution

Publications

Refereed Articles

[1] ** C. Jenkins, A. Marmaduke, and A. Stump, "Simulating large eliminations in cedille," in *27th International Conference on Types for Proofs and Programs, TYPES 2021, June 14-18, 2021, Leiden, The Netherlands (Virtual Conference)*, H. Basold, J. Cockx, and S. Ghilezan, Eds., ser. LIPIcs, vol. 239, Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2021, 9:1–9:22. DOI: 10.4230/LIPIcs.TYPES.2021.9. [Online]. Available: https://doi.org/10.4230/LIPIcs.TYPES.2021.9.

[2] * C. Jenkins and A. Stump, "Monotone recursive types and recursive data representations in cedille," *Math. Struct. Comput. Sci.*, vol. 31, no. 6, pp. 682–745, 2021. DOI: 10.1017/S0960129521000402. [Online]. Available: https://doi.org/10.1017/S0960129521000402.

[3] ** C. Jenkins, A. Stump, and L. Diehl, "Efficient lambda encodings for mendler-style coinductive types in cedille," in *Proceedings Eighth Workshop on Mathematically Structured Functional Programming, MSFP@ETAPS 2020, Dublin, Ireland, 25th April 2020*, M. S. New and S. Lindley, Eds., ser. EPTCS, vol. 317, 2020, pp. 72–97. DOI: 10.4204/EPTCS.317.5. [Online]. Available: https://doi.org/10.4204/EPTCS.317.5.

[4] ** A. Marmaduke, C. Jenkins, and A. Stump, "Zero-cost constructor subtyping," in *IFL 2020: 32nd Symposium on Implementation and Application of Functional Languages, Virtual Event / Canterbury, UK, September 2-4, 2020*, O. Chitil, Ed., ACM, 2020, pp. 93–103. DOI: 10.1145/3462172.3462194. [Online]. Available: https://doi.org/10.1145/3462172.3462194.

[5] * A. Stump, C. Jenkins, S. Spahn, and C. McDonald, "Strong functional pearl: Harper's regular-expression matcher in cedille," *Proc. ACM Program. Lang.*, vol. 4, no. ICFP, 122:1–122:25, 2020. DOI: 10.1145/3409004. [Online]. Available: https://doi.org/10.1145/3409004.

[6] ** A. Marmaduke, C. Jenkins, and A. Stump, "Quotients by idempotent functions in cedille," in *Trends in Functional Programming - 20th International Symposium, TFP 2019, Vancouver, BC, Canada, June 12-14, 2019, Revised Selected Papers*, W. J. Bowman and R. Garcia, Eds., ser. Lecture Notes in Computer Science, vol. 12053, Springer, 2019, pp. 1–20. DOI: 10.1007/978-3-030-47147-7_1. [Online]. Available: https://doi.org/10.1007/978-3-030-47147-7%5C_1.

[7] * A. Stump, "A weakly initial algebra for higher-order abstract syntax in cedille," in *Proceedings of the Fourteenth Workshop on Logical Frameworks and Meta-Languages: Theory and Practice, LFMTP@LICS 2019, Vancouver, Canada, 22nd June 2019*, D. Miller and I. Scagnetto, Eds., ser. EPTCS, vol. 307, 2019, pp. 55–67. DOI: 10.4204/EPTCS.307.6. [Online]. Available: https://doi.org/10.4204/EPTCS.307.6.

[8] ** L. Diehl, D. Firsov, and A. Stump, "Generic zero-cost reuse for dependent types," *Proc. ACM Program. Lang.*, vol. 2, no. ICFP, 104:1–104:30, 2018. DOI: 10.1145/3236799. [Online]. Available: https://doi.org/10.1145/3236799.

[9] ** D. Firsov, R. Blair, and A. Stump, "Efficient mendler-style lambda-encodings in cedille," in *Interactive Theorem Proving - 9th International Conference, ITP 2018, Held as Part of the Federated Logic Conference, FloC 2018, Oxford, UK, July 9-12, 2018, Proceedings*, J. Avigad and A. Mahboubi, Eds., ser. Lecture Notes in Computer Science, vol. 10895, Springer, 2018, pp. 235–252. DOI: 10.1007/978-3-319-94821-8_14. [Online]. Available: https://doi.org/10.1007/978-3-319-94821-8%5C_14.

[10] * D. Firsov and A. Stump, "Generic derivation of induction for impredicative encodings in cedille," in *Proceedings of the 7th ACM SIGPLAN International Conference on Certified Programs and Proofs, CPP 2018, Los Angeles, CA, USA, January 8-9, 2018*, J. Andronick and A. P. Felty, Eds., ACM, 2018, pp. 215–227. DOI: 10.1145/3167087. [Online]. Available: https://doi.org/10.1145/3167087.

[11] ** C. Jenkins and A. Stump, "Spine-local type inference," in *Proceedings of the 30th Symposium on Implementation and Application of Functional Languages, IFL 2018, Lowell, MA, USA, September 5-7, 2018*, M. Cimini and J. McCarthy, Eds., ACM, 2018, pp. 37–48. DOI: 10.1145/3310232.3310233. [Online]. Available: https://doi.org/10.1145/3310232.3310233.

[12] * A. Stump, "From realizability to induction via dependent intersection," *Ann. Pure Appl. Log.*, vol. 169, no. 7, pp. 637–655, 2018. DOI: 10.1016/j.apal.2018.03.002. [Online]. Available: https://doi.org/10.1016/j.apal.2018.03.002.

[13] * ——, "The calculus of dependent lambda eliminations," *J. Funct. Program.*, vol. 27, e14, 2017. DOI: 10.1017/S0956796817000053. [Online]. Available: https://doi.org/10.1017/S0956796817000053.

Software

2015 – present StarExec, multi-community web service for logic solving, www.starexec.org

Areas of Research Interest

Semantics of Programming Languages

Computational Logic

Grants and Contracts

Current

2017 – 2023 *Collaborative Research: CI-SUSTAIN: StarExec: Cross-Community Infrastructure for Logic Solving (CNS-1729603)*
Funded by the National Science Foundation. Investigators: Aaron Stump, Cesare Tinelli, Geoff Sutcliffe (U. Miami). Iowa portion: $610,641 (includes supplement).

Completed

2015 – 2021 *Semantics, Formal Reasoning, and Tool Support for Quantum Programming Solving (AFOSR 14944300)*
Funded by the Air Force Office of Sponsored Research (AFOSR). Investigators: Aaron Stump, Mike Mislove (Tulane), Steve Zdancewic (U. Penn). Iowa portion: $1,007,034.

2015 – 2019 *Lambda Encodings Reborn (CSF-1524519)*
Funded by the National Science Foundation. Investigator: Aaron Stump. Iowa portion: $468,938.

2018 *Cedille Support for Ethereum*
One-time gift from the Ethereum Foundation. Investigator: Aaron Stump. Iowa portion: $50,194.

Invited Lectures and Conference Presentations

International — Keynote Talks

June 2019 Workshop on Syntax and Semantics of Low-Level Languages (LOLA), *Rediscovering Constructive Type Theory with Cedille*, affiliated with the IEEE Symposium on Logic in Computer Science (LICS) Vancouver, British Columbia, Canada

Service

Profession

Program Committee Member

2022 2023 edition of the ACM Conference on Principles of Programming Languages (POPL, international conference)

2022 24th International Symposium on Trends in Functional Programming (TFP)

2021 Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP, international workshop)

2019 2020 edition of ACM Conference on Principles of Programming Languages (POPL, international conference)

2020 Formal Structures for Computation and Deduction (FSCD, international conference)

2019 Formal Structures for Computation and Deduction (FSCD)

Journal Reviewer

2022 Journal of Functional Programming, 1 article

2020 Logical Methods in Computer Science, 2 articles

2019 Logical Methods in Computer Science, 1 article

Conference/Workshop Reviewer

2020 ACM International Conference on Functional Programming (ICFP), member of external review committee

Department

2018 – 2021 Graduate Admissions Committee

College

2019 – 2020 Teaching Awards Committee

University

2017 – 2020 Committee on the Conflict of Interest in Employment

Industry

2019 – 2021 Sunshine Cybernetics Inc., Technical Advisor

Outreach

2019 – present creator of the Iowa Type Theory Commute podcast; over 140 episodes, over 50,000 downloads as of January 1, 2023