

Caleb Stanford CV

Basic Information

Name: Caleb Stanford

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Research Interests

- Programming languages and systems, particularly for distributed stream processing
- Formal verification
- Logical foundations of computing

Education

- **University of Pennsylvania**

PhD student, computer science. Fall 2016 – present. Advisor: Rajeev Alur.

- **Brown University**

ScB, mathematics and computer science. Fall 2013 – Spring 2016.

- **Brigham Young University**

Fall 2012 – Spring 2013.

Industry Research Experience

- **Intern, Microsoft, Research in Software Engineering Group.** Summer 2020.
- **Intern, Amazon Web Services, Automated Reasoning Group.** Summer 2019.

Peer-reviewed Publications

**equal contribution †authors in alphabetical order*

- **Symbolic Boolean Derivatives for Efficiently Solving Extended Regular Expression Constraints**, C. Stanford, M. Veanes, and N. Bjørner. Conditionally accepted to Programming Language Design and Implementation (PLDI), June 2021.
- **DiffStream: Differential Output Testing for Stream Processing Programs**, K. Kallas,^{*} F. Niksic,^{*} C. Stanford,^{*} and R. Alur. Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA), November 2020.
- **Streamable Regular Transductions**,[†] R. Alur, D. Fisman, K. Mamouras, M. Raghothaman, and C. Stanford. Theoretical Computer Science (TCS), February 2020.
- **Data-Trace Types for Distributed Stream Processing Systems**, K. Mamouras, C. Stanford, R. Alur, Z. Ives, and V. Tannen. Programming Language Design and Implementation (PLDI), June 2019.
- **Modular Quantitative Monitoring**,[†] R. Alur, K. Mamouras, and C. Stanford. Principles of Programming Languages (POPL), January 2019.

- **Interfaces for Stream Processing Systems**,[†] R. Alur, K. Mamouras, C. Stanford, and V. Tannen. Invited contribution to Principles of Modeling: Festschrift Symposium in honor of Edward A. Lee, October 2017.
- **Automata-Based Stream Processing**,[†] R. Alur, K. Mamouras, and C. Stanford. International Colloquium on Automata, Languages, and Programming (ICALP), July 2017.

Submissions

**equal contribution [†]authors in alphabetical order*

- **Stream Processing with Dependency-Guided Synchronization**, K. Kallas,^{*} F. Niksic,^{*} C. Stanford,^{*} and R. Alur. In submission, Spring 2021.
- **Guided Dead State Detection in Incremental Graphs**, C. Stanford and M. Veanes. In submission, Spring 2021.

Other Contributions

**equal contribution [†]authors in alphabetical order*

- **Mathematical Muffin Morsels: Nobody Wants A Small Piece**, W. Gasarch, E. Metz, J. Prinz, and D. Smolyak. Book contribution, 2020.
- **Context-Directed Reversals of Signed Permutations**,[†] H. Li, J. Ramsey, M. Scheepers, H. Schilling, and C. Stanford. Outstanding presentation award for poster presentation at the Joint Math Meetings (JMM), January 2016. Travel grant from JMM awarded.

Selected Honors

- **Heidelberg Laureate Forum 2019**: Recipients of the most prestigious awards in mathematics and computer science meet 200 selected young researchers from around the world. Participation with funding (all except travel), September 22–27, 2019, Heidelberg, Germany.

Educational Experience

- Dagstuhl Seminar 19071 — Specification Formalisms for Modern Cyber-Physical Systems. February 10–15, 2019, Schloss Dagstuhl, Germany. Invitational research seminar (approx. 40 participants).
- Marktoberdorf Summer School — Logical methods for safety and security of software systems. August 2–11, 2017, Marktoberdorf, Germany. Accepted with travel grant awarded.
- Lipa Summer School — Topics connected to logic in computer science. July 3–6, 2017, University of Warsaw.
- NASSLLI — North American Summer School on Logic, Language, and Information. July 9–16, 2016, Rutgers University. Scholarship awarded.

Other Achievements

- **Co-founder and problem-writer** for the Utah Math Olympiad, an annual high school mathematics contest. 2013 – present.
- **Putnam math exam**:

Year	Score	National Rank
2012	30	319
2013	40	136
2014	40	150
2015	30	163.5

- **Mathematics Graduate Record Exam (subject GRE):** Score 900 (97th percentile) in fall 2015.
- **ACM International Collegiate Programming Contest (ICPC):** Qualified for the Northeast North America regional round, fall 2014 and fall 2015. 3rd place at qualifier round and 5th place at regionals in 2015, as a team of 3.

Programming Languages

- **Fluent:** Python, C++, Rust
- **Experienced:** Coq, Erlang, Java, OCaml
- **Tools:** Git, Alloy (a constraint solver for system design), LaTeX

Teaching

- **Instructor** for Rust Programming (CIS 198), UPenn. Spring 2021.
- **Graduate TA** for Theory of Computation (CIS 511), UPenn. Spring 2018.
- **Graduate TA** for Software Foundations (CIS 500), UPenn. Fall 2017.
- **TA** for online courses at the Art of Problem Solving (AoPS). Summer 2016.
- **Instructor** for LaTeX workshops at the Science Center, Brown. Spring 2014 – Spring 2016.
- **TA** for Discrete Structures and Probability (CS 22), Brown. Spring 2016.
- **TA** for Models of Computation (CS 51), Brown. Fall 2015.
- **Tutor** for the Math Resource Center, Brown. Fall 2014 – Fall 2015.
- **Tutor** for Math 90 Calculus. Fall 2014.
- **Counselor** at the national middle school math program MathPath. Summer 2013 and Summer 2014.
- **Instructor** for Math Circle for high school students, BYU. Fall 2012 – Spring 2013.

Service

- Volunteer, UPenn Applicant-Support Program (for under-served or under-represented communities in the admissions process), Fall 2020.
- Co-chair, UPenn CIS Graduate Association and PhD student faculty representative, Fall 2018 – present.
- Artifact Evaluation Committee, POPL 2021.
- Artifact Evaluation Committee, CAV 2019.