

# Mukund Raghathan

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## Research Interests

**Programmer productivity tools** Domain-specific languages, program synthesis

**Program verification** Model checking, design and analysis of cyber-physical systems

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## Education

**University of Pennsylvania**

*Ph.D. in Computer Science, Expected graduation: December, 2016*

Thesis: *Regular Programming over Data Streams*

Advisor: Rajeev Alur

**Philadelphia, PA**

*2010–Present*

**Indian Institute of Technology Guwahati**

*Bachelor of Technology in Computer Science*

Thesis: *State Reachability in Counter Automata*

Advisor: Purandar Bhaduri

**Guwahati, India**

*2006–2010*

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## Publications

**Most significant publications: DReX [5, 4] and SWIM [1]**

- [1] Mukund Raghathan, Yi Wei, and Youssef Hamadi. SWIM: Synthesizing What I Mean (Code search and idiomatic snippet synthesis). In *Proceedings of the 38th International Conference on Software Engineering, ICSE, 2016*.
- [2] Rajeev Alur, Dana Fisman, and Mukund Raghathan. Regular programming for quantitative properties of data streams. In *Programming Languages and Systems: 25th European Symposium on Programming, ESOP. Springer, 2016*.
- [3] Rajeev Alur, Mukund Raghathan, Christos Stergiou, Stavros Tripakis, and Abhishek Udupa. Automatic completion of distributed protocols with symmetry. In *Computer Aided Verification, CAV. Springer, 2015*.
- [4] Rajeev Alur, Loris D’Antoni, and Mukund Raghathan. DReX: A declarative language for efficiently evaluating regular string transformations. In *Proceedings of the 42nd Annual Symposium on Principles of Programming Languages, POPL. ACM, 2015*.
- [5] Rajeev Alur, Adam Freilich, and Mukund Raghathan. Regular combinators for string transformations. In *Proceedings of the Joint Meeting of the 23rd Annual Conference on Computer Science Logic and the 29th Annual Symposium on Logic in Computer Science, CSL-LICS. ACM, 2014*.
- [6] Rajeev Alur, Milo Martin, Mukund Raghathan, Christos Stergiou, Stavros Tripakis, and Abhishek Udupa. Synthesizing finite-state protocols from scenarios and requirements. In *Hardware and Software: Verification and Testing, HVC. Springer, 2014*.
- [7] Rajeev Alur, Rastislav Bodik, Garvit Juniwal, Milo Martin, Mukund Raghathan, Sanjit Seshia, Rishabh Singh, Armando Solar-Lezama, Emina Torlak, and Abhishek Udupa. Syntax-guided synthesis. In *Formal Methods in Computer-Aided Design, FMCAD. IEEE, 2013*.
- [8] Rajeev Alur and Mukund Raghathan. Decision problems for additive regular functions. In *Automata, Languages, and Programming, ICALP. Springer, 2013*.

- [9] Rajeev Alur, Loris D’Antoni, Jyotirmoy Deshmukh, Mukund Raghothaman, and Yifei Yuan. Regular functions and cost register automata. In *Proceedings of the 28th Annual Symposium on Logic in Computer Science, LICS*. IEEE, 2013.

Technical Reports.....

- [10] Mukund Raghothaman. Regular programming over data streams. *Ph.D. Thesis Proposal*, 2015.

- [11] Mukund Raghothaman and Abhishek Udupa. Language to specify syntax-guided synthesis problems. *CoRR*, abs/1405.5590, 2014.

## Experience

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Internships.....

**Microsoft Research Ltd.** **Cambridge, UK**

*Research Intern* *June–August, 2014, June–August, 2013*

Advised by: Youssef Hamadi, Yi Wei

Natural Language Code Search and Idiomatic Snippet Synthesis

I developed an algorithm to extract API usage idioms from open-source C# projects and a program synthesizer to answer natural language API-related queries.

**Microsoft Corporation** **Redmond, WA**

*Software Development Engineer Intern* *May–July, 2009*

Manager: Bill Ramsey

Developed a prototype Visual Studio plugin for SCOPE, a SQL-like language used internally at Microsoft.

Teaching.....

**CIS 500, Software Foundations**

*Teaching assistant* *Spring 2012*

Helped with updating and creating new material, homework assignments and exams, and conducted office hours.

**CIS 262, Automata, Computability, and Complexity**

*Teaching assistant* *Fall 2011*

Conducted office hours, prepared solutions to assignments and exams, and graded them.

Professional activities.....

**CAV 2016**

*Artifact Evaluation Committee Member*

**POPL 2016**

*Artifact Evaluation Committee Member*

**PLDI 2016**

*External Review Committee Member*

## Projects

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**DReX:** DReX is a domain-specific language to describe stream transformations. DReX transformations are modular, fast, and are amenable to static analysis. It is the main software artifact I developed during my Ph.D. <https://bitbucket.org/strexp/drex>

**SyGuS:** SyGuS is a uniform format to describe syntax-guided synthesis problems [7, 11]. I also implemented STOCH, a SyGuS solver based on random walks over expression trees, which placed 2nd and 3rd in the first and second SyGuS competitions respectively.

## Awards

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1. Wrote the stochastic SyGuS solver STOCH, which placed 2nd and 3rd in the first and second SyGuS competitions respectively.
2. Honourable mention at the ACM ICPC Asia Regionals, 2009, held at IIT Kanpur.
3. National Talent Search Scholarship, 2004, by the National Council for Educational Research and

Training.

## **Nationality**

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Indian citizen in the U.S. on an F-1 visa