

VIKRAM V. RAMASWAMY

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EDUCATION

2017 to PRESENT PhD in COMPUTER SCIENCE, Princeton University
2012 to 2017 B.Tech & M.Tech in COMPUTER SCIENCE, IIT Madras

ACADEMIC ACHIEVEMENTS

- Awarded fellowship from the Canadian Princeton Alumni Fund, for 2017-18.
- Selected as **Indian Academy of Sciences Summer Research Fellow** for summer 2014.
- Awarded **Sri K Krishnamurthi Prize** in 2014 for best academic record in academic year 2012-13.

SAMPLE PROJECTS

- APR 2019 - AUG 2019 | **New query lower bounds for submodular function minimization**
Prof. S. Matthew Weinberg, *Dept of Comp. Sci, Princeton University*
Established lower bounds of $2n$ for submodular function minimization, $3n/2 - 2$ for the non-trivial minimizer of a symmetric submodular function, and $\binom{n}{2}$ for the non-trivial minimizer of an asymmetric submodular function
Published in *11th Innovations in Theoretical Computer Science Conference, ITCS 2020*. See <https://drops.dagstuhl.de/opus/volltexte/2020/11749/>
- APR 2018 - DEC 2018 | **Private Information Retrieval Protocols, and Connections to Sum Complexes**
Prof. Zeev Dvir, *Dept of Comp. Sci, Princeton University*
Showed that two different protocols for PIR protocols are related through the notion of sum complexes.
- JAN 2016 - MAY 2017 | **Derandomizing Word Problems over Aperiodic Structures**
Prof. Jayalal Sarma, *CSE, IIT Madras*
Derandomized word problems over commutative aperiodic monoids, nilpotent monoids and monoids in **DA**. Extended to derandomize depth 4 AC^0 circuits in P-uniform TC^0 .
- JUN 2016- OCT 2016 | **Algebraic Reachability**
Prof. Jayalal Sarma, *CSE, IIT Madras*
Studied reachability when the edges of the graph are labelled with elements from an algebraic structure, for different classes of graphs, and different algebraic structures. Derived dichotomy (NL vs. L) for undirected graphs labelled with aperiodic monoids. Proved reachability in undirected graphs labelled with groups / quasigroups can be tested in L.
Published in *Proc. of 11th International Conference on Language and Automata Theory and Applications (LATA) 2017*. See https://link.springer.com/chapter/10.1007%2F978-3-319-53733-7_26
- MAY 2015 - JUN 2016 | **Detecting Frauds in Transaction Streams**
Prof. Arnab Bhattacharyya, *CSA, IISc Bangalore* and Dr. Dinesh Garg, *IBM Research, Bangalore*
Developed an efficient framework to detect money laundering by using probabilistic analysis, reducing the problem to a densest subgraph computation.

INDUSTRIAL EXPERIENCE

- FEB 2015 - MAY 2015 | **Facebook Open Academy Project: PredictionIO** (Course project for Principles of Software Engineering)
Worked towards adding a new library (Mahout-Spark) to existing PredictionIO code, to compute item similarity. Completed the basic framework, and submitted it to the PredictionIO repository.
- DEC 2013 - JAN 2014 | **QoE Enhancements for MPEG-DASH Streaming Client**
Intern at *Ittiam Systems, Bangalore*
Improved the throughput of the existing MPEG-DASH streaming client, by introducing various features, including parallel and persistent connections. Increased the overall throughput by **18%**

TEACHING EXPERIENCE

- Princeton University: Was a teaching assistant for
Advanced Complexity Theory (Feb - May 2019) Theory of Computation (Sep 2018 - Jan 2019, Sep 2019 - Jan 2020)
Algorithms and Uncertainty (Seminar) (Sept - Dec 2018)
- IIT Madras: Was a teaching assistant for
Discrete Math for Computer Science (Jan - May 2017) Computability and Complexity (Aug - Nov 2016)
- Dream School Foundation
 - Taught mathematics to students in grades 8 and 10 (May - Jun 2017)
 - Taught basic Bharathanatyam (an Indian classical dance form) to over 35 students. Culminated in a 30 min showcase called *Navarasa* (the nine emotions).