Ravishankar Krishnaswamy

CONTACT INFORMATION

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Computer Science Department
Princeton University
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INTERESTS

I am broadly interested in the design and analysis of approximation algorithms for fundamental optimization problems. I am also interested in solving problems which have *uncertainty in the input*, e.g., the online and stochastic optimization frameworks, and designing energy-aware algorithms, especially for scheduling and routing problems.

EDUCATION

Postdoctoral Research Fellowship (Fall 2012-2014)
Princeton University (Simons Fellowship)
Host: Prof. Moses Charikar

Ph.D in Computer Science (2007-2012)
Carnegie Mellon University
Adviser: Prof. Anupam Gupta
Thesis: Approximation Techniques for Stochastic Combinatorial Optimization

B.Tech in Computer Science (2003-2007)
Indian Institute of Technology Madras

RESEARCH PUBLICATIONS

Online and Stochastic Survivable Network Design
(with Anupam Gupta and R. Ravi). STOC 2009.
Journal version: SIAM J. Comput. special issue for STOC best papers, 41(6), 1649-1672.

Scheduling with Outliers
(with Anupam Gupta, Amit Kumar and Danny Segev). APPROX 2009

Tree Embeddings for 2-Edge-Connected Network Design
(with Anupam Gupta and R. Ravi). SODA 2010

A Constant Factor Approximation Algorithm for Generalized Min-Sum Set Cover
(with Nikhil Bansal and Anupam Gupta). SODA 2010

Scheduling Jobs with Varying Parallelizability to Reduce Variance
(with Anupam Gupta, Sungjin Im, Benjamin Moseley and Kirk Pruhs). SPAA 2010

Better Scalable Algorithms for Broadcast Scheduling
(with Nikhil Bansal and Viswanath Nagarajan). ICALP 2010
Journal version: ACM Transactions on Algorithms

Scalably Scheduling Power-Heterogeneous Processors
(with Anupam Gupta and Kirk Pruhs). ICALP 2010

Network-Wide Deployment of Intrusion Detection and Prevention Systems
(with Anupam Gupta, Michael K. Reiter and Vyas Sekar). CoNEXT 2010

The Matroid Median Problem
(with Viswanath Nagarajan and Barna Saha). SODA 2011

Journal version: Submitted to Math. of Operations Research

On Capacitated Set Cover Problems
(with Nikhil Bansal and Barna Saha). APPROX 2011

Approximation Algorithms for Correlated Knapsack and Non-Martingale Bandits
(with Anupam Gupta, Marco Molinaro and R. Ravi). FOCS 2011

Inapproximatibility Results for the Multi-Level Facility Location Problem
(with Maxim Sviridenko). SODA 2012

Approximation Algorithms for Stochastic Orienteering
(with Anupam Gupta, Viswanath Nagarajan and R. Ravi). SODA 2012
Journal version: to appear in Math. of Operations Research.

Scheduling Heterogeneous Machines isn't as easy as you think
(with Anupam Gupta, Sungjin Im, Benjamin Moseley and Kirk Pruhs). SODA 2012

Unconditional Differentially Private Mechanism for Linear Queries
(with Aditya Bhaskara and Kunal Talwar). STOC 2012

Online Primal-Dual Algorithms for Convex Programs
(with Anupam Gupta and Kirk Pruhs). WAOA 2012

Capacitated Network Design on Undirected Graphs
(with Deeparnab Chakrabarty, Srivatsan Narayanan and Shi Li). APPROX 2013

Improved Approximation Algorithms and Hardness for Broadcast Scheduling
(with Nikhil Bansal, Moses Charikar and Shi Li). SODA 2014

Hallucination helps: Energy efficient routing problems
(with Antonios Antoniadis, Sungjin Im, Ben Moseley, Viswanath Nagarajan, Kirk Pruhs and Cliff Stein). SODA 2014

Cluster before you hallucinate: Approximating Node-Capacitated Network Design
(with Viswanath Nagarajan, Kirk Pruhs and Cliff Stein). Submitted to STOC 2014

Multi-Armed Bandits with Matching Constraints
(with Will Ma and Vahab Mirrokni). Working Paper

Awards and Honors

1. Awarded the Simons Postdoctoral Fellowship 2012-2014.
2. Recipient of the IBM PhD Fellowship 2010-2011.
3. Ranked 2^{nd} in the Computer Science Department for B.Tech, IIT Madras

Research Experience

Postdoctoral Research, Princeton University (Fall 2012-present)
Working with Prof. Moses Charikar, Prof. Kirk Pruhs, and Prof. Cliff Stein on problems in capacitated network design, energy-aware routing algorithms, graph spanners, and broadcast scheduling.

Summer Intern, Microsoft Research, India (Summer 2012)
Worked with Dr. Deeparnab Chakrabarty on topics in undirected graph flows.

Graduate Research, Carnegie Mellon University (2007-2012)
Worked with Prof. Anupam Gupta, Prof. Kirk Pruhs, and Prof. R. Ravi on various topics in online and

stochastic optimization for network design, scheduling, and green computing.

Summer Intern, Microsoft Research, Silicon Valley (Summer 2011)
Worked with Dr. Kunal Talwar and Dr. Udi Wieder on topics in scheduling and differential privacy.

Summer Intern, IBM Research, Yorktown Heights (Summer 2010)
Worked with Prof. Nikhil Bansal, Dr. Viswanath Nagarajan, and Dr. Maxim Sviridenko on problems in facility location and capacitated covering problems.

Summer Intern, IBM Research, Yorktown Heights (Summer 2009)
Worked with Prof. Nikhil Bansal and Dr. Viswanath Nagarajan on broadcast scheduling.

Summer Intern, Northeastern University (Summer 2006)
Worked with Prof. Ravi Sundaram on problems in algorithmic game theory.

Teaching Experience

1. **Probability and Computing (Fall 2010)**.
   Work involved designing and handling recitation lectures, grading homeworks and exams, and holding office hours.
2. **Great Ideas in Theoretical Computer Science (Fall 2008)**.
   Work involved designing and handling recitation lectures, preparing problem sets and exams, grading homeworks and exams, and holding office hours.

Talks

Capacitated Network Design: Algorithms and Hardness. Columbia (Dec. '13), Princeton (Nov. '13), NYU (Oct. '13), CMU (Oct. '13), Google Research (Oct. '13), Bell Labs (Sep. '13), IBM Watson (Jul. '13)

Approximation Techniques for Stochastic Optimization. Princeton (Oct. '12), IBM Watson (Oct. '12), CMU (May. '12), TTI-Chicago (Feb. '12), MSR Redmond (Feb. '12)

Approximation Algorithms for Stochastic Orienteering. SODA 2012 (Jan. '12)

On the Multi-level Facility Location Problem. SODA 2012 (Jan. '12)

Algorithms for Correlated Stochastic Knapsack and Non-Martingale Bandits. FOCS 2011 (Oct. '11)

On the Capacitated Set Cover Problem. APPROX 2011 (Aug. '11)

Scalably Scheduling Power-Heterogeneous Processors. ICALP 2010 (Jul. '10), Dagstuhl (Feb. '10)

Better Scalable Algorithms for Broadcast Scheduling. ICALP 2010 (Jul. '10), IBM Watson (Aug. '09)

Approximating Generalized Min-Sum Set Cover. SODA 2010 (Jan. '10), CMU (Nov. '09)

Tree Embeddings for 2-Edge Connected Network Design. SODA 2010 (Jan. '10), CMU (May. '10)

Scheduling with Outliers. APPROX 2009 (Aug. '09)

Online and Stochastic Survivable Network Design. STOC 2009 (May. '09)

References

1. **Prof. Anupam Gupta**. Computer Science Department, Carnegie Mellon University.
   Email: *anupamg@cs.cmu.edu*
2. **Prof. Nikhil Bansal**. Department of Mathematics and Computer Science, TU Eindhoven.
   Email: *bansal@gmail.com*
3. **Prof. Kirk Pruhs**. Computer Science Department, Univ. of Pittsburgh.
   Email: *kirk@cs.pitt.edu*
4. **Prof. R. Ravi**. Tepper School of Business, Carnegie Mellon University.
   Email: *ravi@cmu.edu*
5. **Prof. Moses Charikar**. Computer Science Department, Princeton University.
   Email: *moses@cs.princeton.edu*