

SHI LI
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BIO & EDUCATION

- 2015 - present: Assistant Professor at University at Buffalo
- 2013 - 2015: Research Assistant Professor at Toyota Technological Institute at Chicago
- 2008 - 2013: Ph.D. in Computer Science at Princeton University
Advisor: Prof. Moses Charikar
- 2004 - 2008: B.S. in Computer Science at Tsinghua University
- 2005 - 2008: Andrew Chi-Chi Yao's Special Pilot Class

RESEARCH INTERESTS

Broadly speaking, my research area is theoretical computer science. Specifically, I am interested in designing and analyzing approximation algorithms for NP-hard combinatorial problems. The main types of problems I worked on include facility location problems, clustering, network routing, network design, resource allocation and scheduling problems.

TEACHING

- Fall 2018 : CSE711: Topics in Combinatorial Optimization and Linear Programming (Seminar)
- Spring 2018 : CSE431/531: Analysis of Algorithms
- Fall 2017: CSE 632: Analysis of Algorithms II
- Fall 2016: CSE 431/531: Analysis of Algorithms
- Spring 2016: CSE 431/531: Analysis of Algorithms
- Fall 2015: CSE 712: Advanced Topics in Algorithm Design (Seminar)
- Winter 2015: EECSE 336: Design and Analysis of Algorithms, Northwestern University
- Fall 2014: Co-Teaching Information and Coding Theory, Toyota Technological Institute at Chicago
- Spring 2010: Teaching Assistant, Cryptography, Princeton University
- Fall 2009: Teaching Assistant, Operating Systems, Princeton University

CURRENT STUDENTS

- Alex Stachnik
- Xiangyu Guo
- Jiayi Xian (co-advising with Prof. Jinhui Xu)
- Yunus Esencayi (co-advising with Prof. Roger He)

EMPLOYMENT AND VISITING POSITIONS

- Assistant Professor, University at Buffalo, 2015 to present
- Research Assistant Professor at Toyota Technological Institute at Chicago, 2013 to 2015
- Research Assistantship at Princeton University, 2008 to 2013
Advisor: Prof. Moses Charikar
- Visiting Shanghai University of Finance and Economy, 2018 summer
- Internship at Bell Labs, Summer 2012
Mentor: Matthew Andrews

- Internship at Toyota Technological Institution at Chicago, Summer 2011
Mentor: Prof. Julia Chuzhoy
- Visiting Microsoft Research Asia, Beijing, China, Fall 2003
Mentor: Prof. Xiangyang Li

GRANTS

- NSF CCF-1566356, CRII:AF: On Designing Approximation Algorithms Based on Round-or-Cut Paradigm, Mar 2016 to August 2018, funding: \$175,000
- Co-PI of NSF CCF-1717134, AF:Small:Tight Topology Dependent bounds on Distributed Communication, 09/01/2017 to 08/31/2020, funding : \$450,000

AWARDS

- SEAS Early Career Researcher of the Year Award, University at Buffalo, 2018
- **COCOON 2018 Best Paper Award**: Approximating Global Optimum for Probabilistic Truth Discovery
- CSE Early Career Researcher of the Year Award, University at Buffalo, 2016
- CSE Early Career Teaching Award of the Year Award, University at Buffalo, 2017
- **FOCS 2012 Best Paper Award**: A Polylogarithmic Approximation for Edge-Disjoint Paths with Congestion 2
- **ICALP 2011 Best Student Paper Award, Track A**: A 1.488 Approximation Algorithm for the Uncapacitated Facility Location Problem
- Wallace Memorial Fellowship, Princeton University, 2012-2013
- Gold Medal in the International Olympiad in Informatics, 2004
- Gold Medal in the Chinese National Olympiad in Informatics, 2003
- 1st place in the 30th ACM/ICPC Regional Asia, Chengdu
- National Scholarships, Tsinghua University, 2005 and 2006
- Freshmen Scholarship, Tsinghua University, 2004,
- Distinguished Thesis Award, Tsinghua University, 2008

PUBLICATIONS

Conference Papers:

- Automating CSI Measurement with UAVs: from Problem Formulation to Energy-Optimal Solution, Sixu Piao, Zhongjie Ba, Lu Su, Dimitrios Koutsonikolas, Shi Li and Kui Ren, InfoComm 2019 (to appear)
- Michael Langberg, Shi Li, Sai Vikneshwar Mani Jayaraman and Atri Rudra, Topology Dependent Bounds for (Some) FAQs, PODS 2019 (to appear)
- Shashwat Garg, Janardhan Kulkarni, Shi Li, Lift and Project Algorithms for Precedence Constrained Scheduling to Minimize Completion Time, SODA 2019 (to appear)
- Uri Feige, Janardhan Kulkarni and Shi Li, A Polynomial Time Constant Approximation for Minimizing Total Weighted Flow-Time, SODA 2019 (to appear)
- Shi Li, On Facility Location with General Lower Bounds, SODA 2019 (to appear)
- Xiangyu Guo, Shi Li, Distributed k -Clustering for Data with Heavy Noise, NIPS 2018 (Spotlight)
- David Harris, Shi Li, Thomas Pensyl, Aravind Srinivasan, Khoa Trinh, Stochastic Fairness in Clustering, NIPS 2018

- Janardhan Kulkarni, Shi Li, Flow-time Optimization When Jobs Have Dependencies, APPROX + RANDOM 2018
- Minwei Ye, Shi Li, Jinhui Xu, Approximating Global Optimum for Probabilistic Truth Discovery, COCOON 2018, **Best Paper Award**
- Ravishankar Krishnaswamy, Shi Li, Sai Sandeep, Constant Approximation for k -Median and k -Means with Outliers via Iterative Rounding, STOC 2018
- Shi Li, Scheduling to Minimize Total Weighted Completion Time via Time-Indexed Linear Programming Relaxations, FOCS 2017, **Invited to a Special Issue of SICOMP**
- Sungjin Im, Shi Li and Benjamin Moseley, Breaking $1-1/e$ Barrier for Non-preemptive Throughput Maximization, IPCO 2017
- Shi Li, Constant Approximation Algorithm for Non-Uniform Capacitated Multi-Item Lot-Sizing via Strong Covering Inequalities, SODA 2017
- Arkadev Chattopadhyay, Michael Langberg, Shi Li and Atri Rudra, Tight Network Topology Dependent Bounds on Rounds of Communication, SODA 2017
- Sungjin Im and Shi Li, Better Unrelated Machine Scheduling for Weighted Completion Time via Random Offsets from Non-Uniform Distributions, FOCS 2016
- Gokalp Demirci and Shi Li, Constant Approximation for Capacitated k -Median with $(1 + \epsilon)$ -Capacity Violation, ICALP 2016
- Julia Chuzhoy, David Kim and Shi Li, Improved Approximation for Node-Disjoint Paths in Planar Graphs, STOC 2016
- Shi Li, Approximating Capacitated k -Median with $(1 + \epsilon)k$ Open Facilities, SODA 2016
- Deeparnab Chakrabarty, Sanjeev Khanna, and Shi Li, On $(1, \epsilon)$ -Restricted Assignment Makespan Minimization, SODA 2015
- Sungjin Im, Benjamin Moseley, Shi Li and Eric Torng, A Dynamic Programming Framework for Non-Preemptive Scheduling Problems on Multiple Machines, SODA 2015
- Shi Li, On Uniform Capacitated k -Median beyond the Natural LP Relaxation, SODA 2015, **Invited to a Special Issue of Transactions on Algorithms**
- Nikhil Bansal, Moses Charikar, Ravishankar Krishnaswamy and Shi Li, Better Algorithms and Hardness for Broadcast Scheduling via a Discrepancy Approach, SODA 2014
- Mohammadtaghi Hajiaghayi, Wei Hu, Jian Li, Shi Li and Barna Saha, A Constant Factor Approximation Algorithm for Fault-Tolerant k -Median, SODA 2014
- Deeparnab Chakrabarty, Ravishankar Krishnaswamy, Shi Li and Srivatsan Narayanan, Capacitated Network Design on Undirected Graphs, APPROX + RANDOM 2013
- Shi Li and Ola Svensson, Approximating k -Median via Pseudo-Approximation, STOC 2013, **Invited to a Special Issue of SICOMP**
- Julia Chuzhoy and Shi Li, A Polylogarithmic Approximation for Edge-Disjoint-Paths with Congestion 2, FOCS 2012, **Best Paper Award, Invited to Journal of ACM**
- Moses Charikar and Shi Li, A Dependent LP-Rounding Approach for the k -Median Problem, ICALP 2012
- Parinya Chalermsook, Julia Chuzhoy Alina Ene, and Shi Li, Approximation Algorithms and Hardness of Integral Concurrent Flow, STOC 2012
- Shi Li, A 1.488-Approximation Algorithm for the Uncapacitated Facility Location Problem, ICALP 2011, **Best Student Paper Award**
- Moses Charikar, Tom Leighton, Shi Li and Ankur Moitra, Vertex Sparsifiers and Abstract Rounding Algorithms, FOCS 2010
- Shi Li, Xiang-Yang Li and YunHao Liu, Capacity of Large Scale Wireless Networks under Gaussian Channel Model, Mobicom 2008

Journal Papers:

- A Polylogarithmic Approximation Algorithm for Edge-Disjoint Paths with Congestion 2, Shi Li, Julia Chuzhoy, *Journal of ACM* 63(5), Dec 2016
- Shabbir Ahmed, Qie He, Shi Li and George Nemhauser, On the Computational Complexity of Minimum-Concave-Cost Flow in a Two-Dimensional Grid, *SIAM Journal on Optimization*
- Shi Li, On Uniform Capacitated k -Median beyond the Natural LP Relaxation, *Transactions on Algorithms*
- Shi Li and Ola Svensson, Approximating k -Median via Pseudo-Approximation, *SIAM Journal on Computing* 45(2), 2016
- Mohammadtaghi Hajiaghayi, Wei Hu, Jian Li, Shi Li and Barna Saha, A Constant Factor Approximation Algorithm for Fault-Tolerant k -Median, *Transactions on Algorithms* 12(3), June 2016
- Shi Li and Gabriel Tucci, Traffic Congestion in Expanders and (p, δ) -Hyperbolic Spaces, *Internet Mathematics* 11(2), 2015
- Shi Li, A 1.488-Approximation Algorithm for the Uncapacitated Facility Location Problem, *Information and Computation* 222, January 2013
- Xiang-Yang Li, Shi Li, Yunhao Liu and Shaojie Tang, Multicast Capacity of Wireless Ad Hoc Networks Under Gaussian Channel Model, *Transactions on Networking* 18(4), 2010

INVITED TALKS

- Approximation on Scheduling under Precedence Constraints,
 - China Theory Week, keynote Speaker, IIIS, Tsinghua University, 2018
- Centralized and Distributed Algorithms for Clustering with Outliers
 - University of Science and Technology of China, July, 2018
 - Shanghai University of Finance and Economy, August, 2018
 - Central South University, August, 2018
- Scheduling to Minimize Total Weighted Completion Time via Time-Indexed Linear Programming Relaxations,
 - Simons Workshop, Berkeley, September, 2017
- On Uniform Capacitated k -Median Beyond Natural LP Relaxation
 - ISMP, Pittsburgh, July 2015
- Better Algorithms and Hardness for Broadcast Scheduling via a Discrepancy Approach
 - Midwest Theory Day, Purdue University, May 2014
- A Polylogarithmic Approximation for Edge-Disjoint Paths with Congestion 2
 - CCI Meeting, Princeton University, Feb 2013
- Approximating k -Median via Pseudo-Approximation
 - DIMACS Seminar Talk, Rutgers University, Aug 2013
 - Theory Talk, IBM Research Watson, Apr 2013
 - Theory Seminar Talk, Cornell University, Mar 2013

SERVICES

- Program Committee Member of MAPSP 2019 (upcoming)
- Program Committee Member of APPROX + RANDOM 2017, SWAT 2018
- Local Committee Member of FWCG 2015