Zhihao Jiang **zhihaojiang99@gmail.com**

Research Interests

- Approximation Algorithms and Online Algorithms
- Graph Algorithms
- Algorithmic Game Theory
- General Algorithm Design and Theoretical Computer Science

Education

Tsinghua University, Beijing, China 2016 – now

Undergraduate, Special Pilot Computer Science Class (Yao Class)

- GPA: 3.6/4.0 (87.6/100).

Publications

1. Zhihao Jiang, Kamesh Munagala, Kangning Wang. *Approximately Stable Committee Selection*. Manuscript
2. Zhihao Jiang, Debmalya Panigraphi, Kevin Sun. *Weighted Paging with Predictions*. Manuscript
3. Yu Cheng, Zhihao Jiang, Kamesh Munagala, Kangning Wang. *Group Fairness in Commitee Selection*. EC 2019
4. Zhihao Jiang, Haoyu Zhao. *An FPTAS for Stochastic Unbounded Min-Knapsack Problem*. FAW 2019

Awards

- Baidu First-Class Scholarship for Scientific Innovation, Tsinghua University 2019
- Zheng Geru Scholarship for Academic Progress, Tsinghua University 2018
- Outstanding Freshman Scholarship, Tsinghua University 2016
- Gold Medal (12th out of 300) in Chinese National Olympiad in Informatics 2015
- Gold Medal (4th out of 230) in IOI Chinese Team Selection Contest 2015

Research Experience

Research Intern, Duke University 2019 – now

Working with Prof. Kamesh Munagala

- The notion of fairness can be applied in machine learning (classification), which provides some graceful properties. We work on exploring the existence of these properties.
- (Finishing) The existence of stable committees is still open in lots of settings. We design an algorithm computing a deterministic approximately stable committee in a general setting, in which the only constraint on voters is monotonicity.
- (Finished) We work on designing a mechanism providing a stable committee, which balances the preferences of voters. We have proved that a stable lottery, *i.e.* randomized committee, always exists in some settings. The result is published in the 20th ACM Conference on Economics and Computation (EC 2019).

Research Intern, Duke University 2019 – now

Working with Prof. Debmalya Panigrahi

- The problem of graph connectivity has been broadly studied. At present, although the connectivity of graphs can be computed in near-linear time, no such algorithm works on hypergraphs. According to new techniques devised recently, we aim to design an algorithm computing the connectivity of hypergraphs efficiently, hopefully in near-linear time.
- (Finishing) Sometimes online algorithms are guided by machine learning predictions. Given forecasts on future inputs, we design online algorithms expecting comparable performance with offline algorithms if the forecasts are good, and expecting comparable performance with online algorithms without prediction even if the forecasts are adversarial. We aim to achieve this goal in the weighted paging problem, the k-server problem, *etc.*

Research Assistant, Tsinghua University 2018 – now

Working with Prof. Jian Li

- We work on improving the competitive ratio of stochastic matching. The state of the art is $4\sqrt{2}-5$ (≈ 0.6568) for unweighted graphs and 0.5001 for weighted graphs by querying $O\left(\frac{\log(1/p)}{p}\right)$ edges per vertex, where p is the probability with which each edge appears independently.
- (Finished) We provide the first FPTAS for the stochastic unbounded min-knapsack problem, a variant of the stochastic knapsack problem. Our main technique is to round the weights of items in a certain way, which is inspired by the FPTAS for the deterministic 0/1 knapsack problem. The result is published in the 13th International Frontiers of Algorithmics Workshop (FAW 2019).