

Zhiyi Huang

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CB 423, Chow Yei Ching Building
Department of Computer Science
The University of Hong Kong

Research Interests

Theoretical Computer Science
Algorithmic Game Theory
Differential Privacy
Online Algorithms

Education and Experience

2014 – present *Assistant Professor*, Computer Science, the University of Hong Kong
2013 – 2014 *Postdoctoral Research Fellow*, Computer Science, Stanford University
Mentor: Tim Roughgarden
2013 *Ph.D.*, Computer and Information Science, University of Pennsylvania
Advisors: Sampath Kannan, Aaron Roth
2011, 2012 *Research Intern*, Microsoft Research Redmond
Mentor: Nikhil R. Devanur
2008 *B.E.*, Computer Science and Technology, Tsinghua University (“Yao Class”)

Selected Honors

2015 *Best Paper Award*, Symposium on Parallelism in Algorithms and Architectures
2014 *Early Career Award*, Research Grant Council of Hong Kong
2013 *Morris and Dorothy Rubinoff Dissertation Award*, University of Pennsylvania
2012 – 2013 *Simons Graduate Fellowship in Theoretical Computer Science*
2004 *Gold Medal*, International Mathematical Olympiad, Athens, Greece
2004 *Silver Medal*, Russian Mathematical Olympiad, Cheboksary, Russia
2004 *Gold Medal*, Chinese Mathematical Olympiad, Macau, China

Surveys

Zhiyi Huang
Online primal dual: beyond linear programs
ACM SIGACT News, Volume 45 Issue 4, December 2014

Zhiyi Huang
Privacy preserving auctions
Encyclopedia of Algorithms 2014

Journal Publications

Justin Hsu, Zhiyi Huang, Aaron Roth, Tim Roughgarden, and Zhiwei Steven Wu
Private matchings and allocations
SIAM Journal on Computing (**SICOMP**), 45(6), 2016

Xiaoxi Zhang, Zhiyi Huang, Chuan Wu, Zongpeng Li, and Francis C.M. Lau
(by contribution)
Online auctions in IaaS clouds: welfare and profit maximization with server costs
IEEE/ACM Transactions on Networking (**ToN**), 2016

Ruiting Zhou, Zongpeng Li, Chuan Wu, and Zhiyi Huang
An efficient cloud market mechanism for computing jobs with soft deadlines
IEEE/ACM Transactions on Networking (**ToN**), 2016

Nikhil R. Devanur, Zhiyi Huang, Nitish Korula, Vahab Mirrokni, and Qiqi Yan
Whole-page optimization and submodular welfare maximization with online bidders
ACM Transactions on Economics and Computation (**TEAC**), 4(3), 2016

Deeparnab Chakrabarty and Zhiyi Huang
Recognizing coverage functions
SIAM Journal on Discrete Mathematics (**SIDMA**), 29(3), 2015

Tanmoy Chakraborty, Zhiyi Huang, and Sanjeev Khanna
Dynamic and non-uniform pricing strategies for revenue maximization
SIAM Journal on Computing (**SICOMP**), 42(6), 2013

Conference Publications

(Unless stated otherwise, authors are sorted in alphabetical order.)

T-H. Hubert Chan, Zhiyi Huang, Shaofeng H.-C. Jiang, Ning Kang, Zhihao Tang
Online submodular maximization with free disposal: randomization beats $\frac{1}{4}$ for partition matroids
28th ACM-SIAM Symposium on Discrete Algorithms (**SODA 2017**)

Yossi Azar, Niv Buchbinder, T-H. Hubert Chan, Shahar Chen, Ilan Reuven Cohen, Anupam Gupta, Zhiyi Huang, Ning Kang, Viswanath Nagarajan, Joseph (Seffi) Naor, Debmalya Panigrahi

Online algorithms for covering and packing problems with convex objectives
57th Annual IEEE Symposium on Foundations of Computer Science (**FOCS 2016**)

Nikhil R. Devanur, Zhiyi Huang, Christos-Alexandros Psomas
The Sample Complexity of Auctions with Side Information
48th Annual Symposium on the Theory of Computing (**STOC 2016**)

Justin Hsu, Zhiyi Huang, Aaron Roth, and Zhiwei Steven Wu
Jointly private convex programming
27th ACM-SIAM Symposium on Discrete Algorithms (**SODA 2016**)

Nikhil R. Devanur, Miro Dudik, Zhiyi Huang, and David Pennock
Budget constraints in prediction markets
31st Conference on Uncertainty in Artificial Intelligence (**UAI 2015**)

Zhiyi Huang, Yishay Mansour, and Tim Roughgarden
Making the most of your samples
16th ACM Conference on Economics and Computation (**EC 2015**)
Invited to ACM Transactions on Economics and Computation (**TEAC**), special issue for EC 2015

Yossi Azar, Nikhil R. Devanur, Zhiyi Huang, and Debmalya Panigrahi
Non-clairvoyant online scheduling to minimize energy
27th ACM Symposium on Parallelism in Algorithms and Architectures (**SPAA 2015, Best Paper**)

Xiaoxi Zhang, Zhiyi Huang, Chuan Wu, Zongpeng Li, and Francis C.M. Lau
(by contribution)
Online auctions in IaaS clouds: welfare and profit maximization with server costs
ACM SIGMETRICS 2015

Zhiyi Huang, and Anthony Kim
Welfare maximization with production costs: a primal dual approach
26th ACM-SIAM Symposium on Discrete Algorithms (**SODA 2015**)
Invited to Games and Economic Behavior (**GEB**), special issue for algorithmic game theory papers from STOC/FOCS/SODA 2014 and 2015

Justin Hsu, Zhiyi Huang, Aaron Roth, Tim Roughgarden, and Zhiwei Steven Wu
Private matchings and allocations
46th Annual Symposium on the Theory of Computing (**STOC 2014**)
Invited to Games and Economic Behavior (**GEB**), special issue for algorithmic game theory papers from STOC/FOCS/SODA 2014 and 2015

Zhiyi Huang and Aaron Roth
Exploiting metric structure for efficient private query release
25th ACM-SIAM Symposium on Discrete Algorithms (**SODA 2014**)

Nikhil R. Devanur and Zhiyi Huang
Primal dual gives optimal energy efficient online algorithms
25th ACM-SIAM Symposium on Discrete Algorithms (**SODA 2014**)

Nikhil R. Devanur, Zhiyi Huang, Nitish Korula, Vahab Mirrokni, and Qiqi Yan
Whole-page optimization and submodular welfare maximization with online bidders
14th ACM Conference on Electronic Commerce (**EC 2013**)
Invited to ACM Transactions on Economics and Computation (**TEAC**), special issue for EC 2013

Yang Cai and Zhiyi Huang
Simple and nearly optimal multi-item auctions
24th ACM-SIAM Symposium on Discrete Algorithms (**SODA 2013**)

Zhiyi Huang and Sampath Kannan
The exponential mechanism for social welfare: private, truthful, and nearly optimal
53rd Annual IEEE Symposium on Foundations of Computer Science (**FOCS 2012**)

Deeparnab Chakrabarty and Zhiyi Huang
Testing coverage functions
39th International Colloquium on Automata, Languages and Programming (**ICALP 2012**)

Zhiyi Huang, Sampath Kannan, and Sanjeev Khanna
Algorithms for the generalized sorting problem
52nd Annual IEEE Symposium on Foundations of Computer Science (**FOCS 2011**)

Xiaohui Bei and Zhiyi Huang
Bayesian incentive compatibility via fractional assignments
22nd ACM-SIAM Symposium on Discrete Algorithms (**SODA 2011**)

Zhiyi Huang, Lei Wang, and Yuan Zhou
Black-box reductions in mechanism design
14th International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (**APPROX 2011**)

Zhiyi Huang and Sampath Kannan
Sampling from constrained multivariate distribution
15th International Workshop on Randomization and Computation (**RANDOM 2011**)

Tanmoy Chakraborty, Zhiyi Huang, and Sanjeev Khanna
Dynamic and non-uniform pricing strategies for revenue maximization
50th Annual IEEE Symposium on Foundations of Computer Science (**FOCS 2009**)
Invited to SIAM Journal on Computing (**SICOMP**), special issue for FOCS 2009

Sudipto Guha and Zhiyi Huang
Revisiting the direct sum theorem and space lower bounds in random order streams
36th International Colloquium on Automata, Languages and Programming (**ICALP 2009**)

Shiteng Chen, Zhiyi Huang, and Sampath Kannan
Reconstructing numbers from pairwise function values
20th International Symposium on Algorithms and Computation (**ISAAC 2009**)
Invited to Algorithmica, special issue for ISAAC 2009

Theses

Zhiyi Huang

New techniques for computation over private data

Doctoral dissertation, advised by Prof. Sampath Kannan and Prof. Aaron Roth, 2013

Zhiyi Huang

On constructing web directory based on user behavior (in Chinese)

Bachelor thesis, advised by Prof. Yiqun Liu and Prof. Shaoping Ma, 2008

External Grant (as PI)

2016 – 2019	<i>The algorithmic and information theoretic foundations of Bayesian mechanism design</i> HKU17257516E, Research Grant Council of Hong Kong	(675,647 HKD)
2015 – 2018	<i>New frontiers of the online primal dual technique: convex programs and limitations of the canonical approach</i> HKU17202115E, Research Grant Council of Hong Kong	(496,028 HKD)
2014 – 2017	<i>Privacy-preserving mechanisms in economic markets</i> HKU27200214E, Research Grant Council of Hong Kong, Early Career Scheme	(931,737 HKD)

Selected Talks (excluding conference presentations)

Theoretical foundations of data-driven auction design

- Zhejiang University, March, 2017
- Shanghai Jiao Tong University, March, 2017

Online submodular matroid maximization with free disposal

- Zhejiang University, Complexity & Algorithm Workshop, May, 2016

The sample complexity of auctions with side information

- University of Pennsylvania, January, 2016

Making the most of your samples

- Microsoft Research, June, 2015
- Berkeley EconCS Seminar, March, 2014

Online primal dual: beyond linear programs

- Hong Kong Theory Day, January, 2015

Primal dual gives optimal energy efficient online algorithms

- Stanford Theory Lunch, February, 2014

Privacy-preserving auctions

- Dagstuhl Seminar on Electronic Markets and Auctions, November, 2013

- EC Workshop on Privacy and Economics, June, 2013
- UW-MSR Theory Center, August, 2012.
- Microsoft Research, Redmond, July, 2012.
- Hong Kong University of Science and Technology, May, 2012.
- The Chinese University of Hong Kong, April, 2012.
- University of Pennsylvania, December, 2011.

Whole-page optimization and submodular welfare maximization with online bidders

- MSR Asia, May, 2013
- Shanghai Jiaotong University, May, 2013

(Generalized) online bipartite matching with free-disposal

- Shanghai Jiao Tong University, May, 2013.
- Microsoft Research Asia, May, 2013.

How to compute over private data?

- The University of Hong Kong, March, 2013
- The Hong Kong University of Science and Technology, March, 2013
- Microsoft Research, Redmond, February, 2013
- Microsoft Research, Silicon Valley, January, 2013
- Microsoft Research, New England, January, 2013

Exploiting metric structure for efficient private query release

- DIMACS, October, 2012.

Bayesian incentive compatibility via fractional assignments

- China Theory Week, Tsinghua University, September, 2011
- University of Pennsylvania, May, 2010.

Dynamic and non-uniform pricing strategies for revenue maximization

- University of Pennsylvania, October, 2009.

Services

Member of the Board of Faculty of Engineering (since 2014 Fall)

Member of Departmental Research Postgraduate Committee (since 2016 Spring)

Member of Departmental Research Committee (since 2016 Spring)

Thesis Committee: Weijie Shi (PhD), Haiyang Wu (MPhil)

Chair of Thesis Advisory Committee: Chaofeng Chen (PhD), Meiqi He (PhD), Jiafeng Hu (PhD), Jianyu Jiang (PhD), Xiaoke Wang (MPhil), Hui Zhang (PhD), Weixin Zhang (MPhil)

Thesis Advisory Committee: Shuguang Hu (PhD), Zhihao Tang (PhD),

Program committee: EC 2017, EC 2016, TAMC 2016, WINE 2016, EC 2015, ISAAC 2015

Regular Reviewer for: *Algorithmica*, *ACM Transactions on Economics and Computation (TEAC)*, *Mathematics of Operations Research (MOR)*, *SIAM Journal on Computing (SICOMP)*, *Theoretical Computer Science (TCS)*, *STOC*, *FOCS*, *SODA*, *ICALP*, *EC*, *WINE*, *ESA*, *MFCS*, *TAMC*, *ISAAC*

Patents

Energy-efficient job scheduling. (US 2014/0380321 A1)

Real-time prediction market. (US 2014/0379462 A1)

Teaching

2017 Spring	CSIS0250/COMP3250A Design and Analysis of Algorithms
2016 Fall	COMP9601 Theory of Computation and Algorithms Design
2016 Spring	CSIS0250/COMP3250A Design and Analysis of Algorithms COMP8601 Advance Topics in Theoretical Computer Science
2015 Spring	CSIS0250/COMP3250A Design and Analysis of Algorithms

Advising

Current Ph.D. and M.Phil Students:

- KANG, Ning (2014 – present)
- LIU, Jinyan (2015 – present)
- ZHU, Xue (2015 – present)
- ZHANG, Yuhao (2016 – present)
- WANG, Xiangning (2016 – present)

Undergraduate Students:

- ZHANG, Jiarui (from "ACM Class" of SJTU, 2016 Aug. – 2017 Jan.)
- ZHANG, Mengqiao (from HKU, 2016 Sep. – 2016 Dec.)
- SUN, Yuxin (from NJU, 2016 Aug.)
- WEI, Yadi (from NJU, 2016 Aug.)
- GAN, Guo Liang (from HKU, 2015 Oct. – 2016 Jan., admitted to Simon Fraser as a Ph.D.)
- JI, Ziwei (from "ACM Class" of SJTU, 2015 Aug. – 2016 Jan., admitted UIUC as a Ph.D.)
- CHEN, Yu (from "ACM Class" of SJTU, 2015 Aug. – 2016 Jan., admitted to Penn as a Ph.D.)
- FENG, Yiding (from "ACM Class" of SJTU, 2015 Aug. – 2016 Jan., admitted Northwestern as a Ph.D.)
- LI, Zhulin (from "Yao Class" of Tsinghua, 2015 Aug., admitted to MIT as a Ph.D.)
- ZHAN, Wei (from "Yao Class" of Tsinghua, 2015 Aug.)
- SHI, Zhewei (from HKU, 2015 Sep. – Dec.)