

PINYAN LU

Professor and Founding Director
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Education

- **Tsinghua University** 09/2005-01/2009
Ph.D. in Computer Science Beijing, P. R. China
Advisors: Prof. Andrew C. Yao and Prof. Jin-Yi Cai
Thesis: The Complexity of Counting Problems and Holographic Algorithms
- **Tsinghua University** 09/2001-07/2005
B.E. in Computer Science Beijing, P. R. China
- **The 1st High School of Jiaxing** 09/1998-07/2001

Employment

- **Professor** 12/2015-Present
Shanghai University of Finance and Economics
- **Lead Researcher** 09/2012-12/2015
Microsoft Research Asia
- **Visiting Chair Professor** 6/2012-Present
Shanghai Jiao Tong University
- **Adjunct Professor** 7/2011-Present
Shanghai Jiao Tong University
- **Researcher** 09/2010-08/2012
Microsoft Research Asia
- **Associate Researcher** 03/2009-08/2010
Microsoft Research Asia

Publications

1. **FPTAS for Hardcore and Ising Models on Hypergraphs.** with Kuan Yang and Chihao Zhang, STACS 2016.
2. **Canonical Paths for MCMC: from Art to Science.** with Lingxiao Huang and Chihao Zhang, SODA 2016.
3. **FPTAS for #BIS with Degree Bounds on One Side.** with Jingcheng Liu, STOC 2015.
4. **Improved Efficiency Guarantees in Auctions with Budgets.** with Tao Xiao, EC 2015.
5. **Competitive analysis via benchmark decomposition.** with Ning Chen and Nick Gravin, EC 2015.

6. **FPTAS for Counting Monotone CNF.** with Jingcheng Liu, SODA 2015.
7. **FPTAS for Counting Weighted Edge Covers.** with Jingcheng Liu and Chihao Zhang, ESA 2014.
8. **The Complexity of Ferromagnetic Two-spin Systems with External Fields.** with Jingcheng Liu and Chihao Zhang, RANDOM 2014.
9. **FPTAS for Weighted Fibonacci Gates and Its Applications.** with Menghui Wang and Chihao Zhang, ICALP 2014.
10. **Optimal Competitive Auctions.** with Ning Chen and Nick Gravin, STOC 2014.
11. **A Simple FPTAS for Counting Edge Covers** Chengyu Lin and Jingcheng Liu, SODA 2014.
12. **Truthful Generalized Assignments via Stable Matching.** with Ning Chen and Nick Gravin, Mathematics of Operations Research, 2013.
13. **Characterization of Truthful Mechanisms for One-dimensional Single Facility Location Game with Payments.** with Lan Yu, WINE 2013.
14. **Improved FPTAS for Multi-Spin Systems** with Yitong Yin, RANDOM 2013.
15. **Competitive Auctions for Markets with Positive Externalities** with Nick Gravin, ICALP 2013.
16. **The Complexity of Approximating Conservative Counting CSPs.** with Xi Chen, Martin Dyer, Leslie Ann Goldberg, Mark Jerrum, Colin McQuillan and David Richerby, STACS 2013.
17. **Correlation Decay up to Uniqueness in Spin Systems.** with Liang Li and Yitong Yin, SODA 2013.
18. **Dichotomy for Holant* Problems with a Function on Domain Size 3.** with Jin-Yi Cai and Mingji Xia, SODA 2013.
19. **On Optimal Differentially Private Mechanisms for Count-Range Queries.** with Chen Zeng, Jin-Yi Cai, and Jeffrey Naughton, ICDT 2013.
20. **A Dichotomy for Real Weighted Holant Problems.** with Sangxia Huang, CCC 2012.
21. **Budget Feasible Mechanism Design: From Prior-Free to Bayesian.** with Xiaohui Bei, Ning Chen and Nick Gravin, STOC 2012.
22. **Computing the Nucleolus of Matching, Cover and Clique Games.** with Ning Chen and Hongyang Zhang, AAI 2012.
23. **Inapproximability After Uniqueness Phase Transition in Two-Spin Systems.** with Jin-Yi Cai, Xi Chen and Heng Guo. COCOA 2012.
24. **Approximate Counting via Correlation Decay in Spin Systems.** with Liang Li and Yitong Yin, SODA 2012.

25. **On the Approximation Ratio of k-lookahead Auction.** with Xue Chen, Guangda Hu and Lei Wang, WINE 2011.
26. **Optimal Pricing in Social Networks with Incomplete Information.** with Wei Chen, Xiaorui Sun, Bo Tang, Yajun Wang and Zeyuan Allen Zhu, WINE 2011.
27. **The Complexity of Symmetric Boolean Parity Holant Problems.** with Heng Guo and Leslie Valiant, ICALP 2011.
28. **Non-negatively Weighted #CSPs: An Effective Complexity Dichotomy.** with Jin-Yi Cai and Xi Chen, CCC 2011.
29. **The Complexity of Weighted Boolean #CSP Modulo k .** with Heng Guo, Sangxia Huang, and Mingji Xia, STACS 2011.
30. **Dichotomy for Holant* Problems of Boolean Domain.** with Jin-yi Cai and Mingji Xia, SODA 2011.
31. **On the Approximability of Budget Feasible Mechanisms.** with Ning Chen and Nick Gravin, SODA 2011.
32. **Envy-free Pricing with General Supply Constraints.** with Sungjin Im and Yajun Wang, WINE 2010.
33. **From Holant To #CSP And Back: Dichotomy For Holant^c Problems.** with Jin-Yi Cai and Sangxia Huang, ISAAC 2010.
34. **Holographic Algorithms with Matchgates Capture Precisely Tractable Planar #CSP.** with Jin-Yi Cai and Mingji Xia, FOCS 2010.
35. **On Tractable Exponential Sums.** with Jin-Yi Cai, Xi Chen and Richard Lipton, FAW 2010.
36. **Graph Homomorphisms with Complex Values: A Dichotomy Theorem.** with Jin-Yi Cai and Xi Chen, ICALP 2010.
37. **Asymptotically Optimal Strategy-Proof Mechanisms for Two-Facility Games.** with Xiaorui Sun, Yajun Wang and Zeyuan Allen Zhu, ACM EC 2010.
38. **On 2-Player Randomized Mechanisms for Scheduling.** WINE 2009.
39. **Tighter Bounds for Facility Games.** with Yajun Wang and Yuan Zhou, WINE 2009.
40. **Holant Problems and Counting CSP.** with Jin-Yi Cai and Mingji Xia, STOC 2009.
41. **A Computational Proof of Complexity of Some Restricted Counting Problems.** with Jin-Yi Cai and Mingji Xia, TAMC 2009.
42. **Worst-Case Nash Equilibria in Restricted Routing.** with Changyuan Yu, WINE 2008.
43. **Randomized Truthful Mechanisms for Scheduling Unrelated Machines.** with Changyuan Yu, WINE 2008.
44. **Signature Theory in Holographic Algorithms.** with Jin-Yi Cai, ISAAC 2008.

45. **Holographic Algorithms by Fibonacci Gates and Holographic Reductions for Hardness.** with Jin-Yi Cai and Mingji Xia, FOCS 2008.
46. **An Improved Randomized Truthful Mechanism for Scheduling Unrelated Machines.** with Changyuan Yu, STACS 2008.
47. **Holographic Algorithms with Unsymmetric Signatures.** with Jin-Yi Cai , SODA 2008.
48. **On Block-wise Symmetric Signatures for Matchgates.** with Jin-Yi Cai, FCT 2007.
49. **Holographic Algorithms: The Power of Dimensionality Resolved.** with Jin-Yi Cai, ICALP 2007.
50. **Holographic Algorithms: From Art to Science.** with Jin-Yi Cai, STOC 2007.
51. **Bases Collapse in Holographic Algorithms.** with Jin-Yi Cai, CCC 2007.
52. **On the Theory of Matchgate Computations.** with Jin-Yi Cai and Vinay Choudhary, CCC 2007.
53. **On Symmetric Signatures in Holographic Algorithms.** with Jin-Yi Cai, STACS 2007.
54. **Truthful Auctions with Optimal Profit.** with Shang-Hua Teng and Changyuan Yu, WINE 2006.
55. **Simulating Undirected st -Connectivity Algorithms on Uniform JAGs and NNJAGs.** with jialin zhang, Chung Keung Poon, Jin-Yi Cai, ISAAC 2005.

Honors and Awards

- **Young Scientist Award of CCF 2014**
Young Scientist Award is given by China Computer Federation (CCF) to at most three outstanding researchers of age below 40 in the area of computer science each year.
- **Best Paper Award in ISAAC 2010**
Received a best paper award, given by the program committee of ISAAC 2010 for the paper “From Holant To #CSP And Back: Dichotomy For Holant^c Problems.”.
- **Best Paper Award in FAW 2010**
Received a best paper award, given by the program committee of the Fourth International Frontiers of Algorithmics Workshop (FAW 2010) for the paper “On Tractable Exponential Sums”.
- **Excellent PhD Thesis Award 2009**
Received a Excellent PhD Thesis Award from Tsinghua University for the PhD thesis “The Complexity of Counting Problems and Holographic Algorithms”.

- **Microsoft Research Fellowship 2008**

Microsoft Research Asia Fellowship Program is designed to empower and encourage PhD students in the Asia-Pacific region to realize their potential in computer science-related research as well as recognizing and awarding outstanding PhD students.

- **Best Paper Award in ICALP 2007**

Received a best ICALP paper award, given by the European Association for Theoretical Computer Science (EATCS) for the paper “Holographic Algorithms: The Power of Dimensionality Resolved”.

- **Tsinghua Top-Grade Scholarship 2007**

This is the highest honor for students in Tsinghua University, and is given to at most 5 outstanding students out of about 13,000 graduate students each year.

Professional Activities

- Program Committee Member of FOCS 2015 (the 56th Annual IEEE Symposium on Foundations of Computer Science).
- Program Committee Member of ICALP 2015 (the 42nd International Colloquium on Automata, Languages and Programming).
- Program Committee co-Chair for Poster track of WINE 2014 (The 10th Conference on Web and Internet Economics).
- Program Committee Member of ISAAC 2014 (The 25th International Symposium on Algorithms and Computation).
- Program Committee Member of STOC 2013 (the 45th ACM Symposium on the Theory of Computing).
- Program Committee Member of TAMC 2013 (the 10th annual conference on Theory and Applications of Models of Computation).
- Program Committee co-Chair of FAW-AAIM 2012 (the 6th International Frontiers of Algorithmics Workshop and The 8th International Conference on Algorithmic Aspects of Information and Management).
- Program Committee Member of ICALP 2012 (the 39th International Colloquium on Automata, Languages and Programming).
- Program Committee Member of CATS 2012 (the 18th Computing: the Australasian Theory Symposium).
- Program Committee Member of WINE 2011 (the 7th Workshop on Internet and Network Economics).
- Program Committee Member of COCOON 2011 (the 17th Annual International Computing and Combinatorics Conference).
- Program Committee Member of FAW-AAIM 2011 (the 5th International Frontiers of Algorithmics Workshop and The 7th International Conference on Algorithmic Aspects of Information and Management).

- Program Committee Member of FAW 2010 (the 4th International Frontiers of Algorithmics Workshop).

Invited Seminars and Talks

- **Approximate Counting via Correlation Decay** Aug 19, 2015
Keynote speech at China Theory Week 2015 Shanghai, China
- **Optimal Competitive Auctions** May 19, 2015
KAIST Discrete Math Seminar Seoul, Korea
- **Approximate Counting via Correlation Decay** Apr. 23, 2015
Theory seminar at ICT, CAS Beijing, China
- **Approximate Counting via Correlation Decay** Mar. 17, 2015
IMA workshop of The Power of Randomness in Computation Georgia, US
- **Optimal Competitive Auctions** Jan. 26, 2015
BASICS new year workshop Shanghai, China
- **Approximate Counting via Correlation Decay** Sep. 17, 2014
Simons Workshop of Geometric Complexity Theory Berkeley, US
- **Pricing and Auctions for Markets with Externalities** Jul. 21, 2014
Game Theory Workshop Shanghai, China
- **Classifying Computational Counting Problems** May 7, 2014
Zhiyuan seminar at SJTU Shanghai, China
- **Pricing and Auctions for Markets with Externalities** Oct. 15, 2013
Theory seminar at ICT, CAS Beijing, China
- **Approximate Counting via Correlation Decay** Oct. 14, 2013
Seminar at ITP, CAS Beijing, China
- **Approximate Counting via Correlation Decay** Aug. 1, 2013
Seminar at Tokyo Inst. of Tech Tokyo, Japan
- **Complexity Dichotomies of Counting Problems** Mar. 16, 2013
ELC Tokyo Complexity Workshop. Tokyo, Japan
- **Budget Feasible Mechanisms** Jan. 11, 2013
IMS workshop on Algorithmic Game Theory. Singapore
- **Correlation Decay up to Uniqueness in Spin Systems** Dec.12, 2012.
Seminar at IASTU, Tsinghua. Beijing, China
- **Holant Problems: CSPs Where Each Variable Appears Exactly Twice** Nov 8, 2012. Dagstuhl, Germany
Dagstuhl Seminar On CSP.
- **Correlation Decay up to Uniqueness in Spin Systems** Nov.2, 2012.
Theory seminar at MPI. Saarbrücken , Germany

- **Classifying Computational Counting Problems** Dec.21, 2011
Theory seminar at Nanjing Univ. Nanjing, P.R. China
- **Approximate counting via correlation decay in spin systems** Nov.5, 2011
Workshop: Counting, Inference, and Optimization on Graphs. Princeton, U.S.A.
- **Complexity Dichotomies of Counting Problems** Oct.27, 2011
Workshop for CS alumni of Tsinghua. Beijing, P.R. China
- **Mechanism Design without Money via Stable Matching** Oct. 21, 2011
Yangtze TCS Seminar. Huzhou, P.R. China
- **Lectures on Mechanism Design** Aug.14-19, 2011
BASICS Summer School on AGT. Qingdao, P.R. China
- **Asymptotically Optimal Strategy-Proof Mechanisms for Two-Facility Games**
Theory seminar at National University of Singapore. Mar.2, 2011. Singapore
- **Budget feasible mechanisms** Feb. 21, 2011
Yangtze TCS Seminar. Hangzhou, P.R. China
- **Holographic Algorithms Capture Precisely Tractable Planar #CSP**
Theory seminar at East China Normal Univ.. Dec.31, 2010. Shanghai, P.R. China
- **Complexity Dichotomies of Counting Problems** Dec.18, 2010
45-minutes invited talk at ICCM 2010 Beijing, P.R. China
- **Complexity Dichotomies of Counting Problems** Dec.7, 2010
Theory seminar at Nanjing Univ. Nanjing, P.R. China
- **Asymptotically Optimal Strategy-Proof Mechanisms for Two-Facility Games**
Theory seminar at MPI. Dec.4, 2010. Saarbrücken , Germany
- **Complexity Dichotomies of Holant Problems** Nov 28, 2010
Dagstuhl Seminar on Computational Counting. Dagstuhl, Germany
- **Asymptotically Optimal Strategy-Proof Mechanisms for Two-Facility Games**
Theory seminar at ITCS of Tsinghua Univ. May.13, 2010. Beijing, P.R. China
- **Asymptotically Optimal Strategy-Proof Mechanisms for Two-Facility Games**
Algorithm and Information Colloquium at CAS. Apr.14, 2010. Beijing, P.R. China
- **Asymptotically Optimal Strategy-Proof Mechanisms for Two-Facility Games**
Theory seminar at SJTU BASICS lab. Apr.1, 2010. Shanghai, P.R. China
- **The Complexity of Counting Problems and Holographic Algorithms**
Theory seminar at Peking Univ. Jul.2, 2009. Beijing, P.R. China
- **The Complexity of Counting Problems and Holographic Algorithms**
Annual Meeting of AAAC 2009. Apr.11, 2009. Hangzhou, P.R. China
- **Holographic Reduction: Design Algorithms and Prove Hardness**
China Theory Week at Tsinghua Univ. Sep.23, 2008. Beijing, P.R. China

- **Holographic Reduction: Design Algorithms and Prove Hardness**
Theory seminar at the Chinese Univ. of Hong Kong. May.5, 2008. Hong Kong
- **Randomized Truthful Mechanisms for Scheduling Unrelated Machines**
Theory seminar at HongKong Univ. of Sci. & Tech. May.2, 2008. Hong Kong
- **Holographic Algorithms with Unsymmetric Signatures** Sep.17, 2007
China Theory Week at Tsinghua Univ. Beijing, P.R. China
- **Holographic Algorithms** Aug.6, 2007
BASICS Summer School. Zhejiang, P.R. China
- **Holographic Algorithms: From Art to Science** Apr.11, 2007
China Theory Day at Tsinghua Univ. Beijing, P.R. China
- **Holographic Algorithms: From Art to Science** Feb.27, 2007
Theory seminar at TTI and Univ. of Chicago. Chicago, IL, U.S.A
- **Holographic Algorithms: From Art to Science** Feb.26, 2007
Theory Seminar at IIT. Chicago, IL, U.S.A
- **Holographic Algorithms** Feb.14, 2007
Theory Chit-Chat at Univ. of Wisconsin. Madison, WI, U.S.A
- **Holographic Algorithms: From Art to Science** Dec.8, 2006
Theory Seminar at Boston Univ. Boston, MA, U.S.A

Past and Current PhD Students at SJTU

- Chihao Zhang

Past and Current Intern Students at MSRA

- Jingcheng Liu (from UC Berkeley)
- Menghui Wang (from University of Wisconsin - Madison)
- Liang Li (from Peking University, now at Microsoft Research)
- Xue Chen (from Tsinghua)
- Nick Gravin (from NTU, now at Microsoft Research)
- Zeyuan Zhu (from MIT)
- Lei Wang (from Georgia Institute of Technology)
- Sangxia Huang (from KTH)
- Yuan Zhou (from CMU)

Research and Teaching Experiences

- **Visiting Scientist** Jan.2016-May 2016
Simons Institute for the Theory of Computing at UC Berkeley Berkeley, U.S.A

- **Instructor** Sep.2012-Jan.2013
Algorithm Design at Shanghai Jiao Tong University
 Shanghai, P.R. China
- **Visiting Scholar** Jun. 2008 - Sep. 2008
 University of Wisconsin-Madison
 Madison, WI, U.S.A
- **Teaching Assistant** Feb.2008-Jun.2008
Distributed Computing by Dr. Wei Chen
 Beijing, P.R. China
- **Visiting Scholar** Jun. 2007 - Jul. 2007
 University of Wisconsin-Madison
 Madison, WI, U.S.A
- **Visiting Scholar** Sep. 2006 - Mar. 2007
 University of Wisconsin-Madison
 Madison, WI, U.S.A
- **Visiting Student** Dec.2005 - Jun.2006
 Microsoft Research Asia
 Beijing, P.R. China
- **Teaching Assistant** Feb.2006-Jun.2006
Theoretical Computer Science by Prof. Andrew C. Yao
 Beijing, P.R. China
- **Visiting Scholar** Jul.2005-Sep.2005
 University of Michigan-Ann Arbor
 Ann Arbor, MI, U.S.A