PINYAN LU
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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

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

- **Researcher** 09/2010-08/2012
  Microsoft Research Asia

- **Associate Researcher** 03/2009-08/2010
  Microsoft Research Asia

Publications

1. **Bayesian auctions with efficient queries.** with Jing Chen, Bo Li, Yingkai Li, Artif. Intell. 303: 103630 (2022)

2. **Online Selection Problems against Constrained Adversary.** with Zhihao Jiang, Pinyan Lu, Zhihao Gavin Tang, Yuhao Zhang, ICML 2021

3. **An Algorithmic Framework for Approximating Maximin Share Allocation of Chores.** with Xin Huang, EC 2021.

4. **Tight Revenue Gaps among Multi-Unit Mechanisms.** with Yaonan Jin, Shunhua Jiang, Pinyan Lu, Hengjie Zhang, EC 2021.

5. **Approximating Permanent of Random Matrices with Vanishing Mean: Made Better and Simpler.** with Zhengfeng Ji, Zhihan Jin, SODA 2021.

6. **Concentration bounds for almost k-wise independence with applications to non-uniform security.** with Nick Gravin, Siyao Guo, Tsz Chiu Kwok, SODA 2021.

7. **Generalized Sorting with Predictions.** with Xuandi Ren, Enze Sun, Yubo Zhang, SOSA 2021.

8. **Variance-dependent best arm identification.** with Chao Tao, Xiaojin Zhang, UAI 2021.

9. **Relaxing the Independence Assumption in Sequential Posted Pricing, Prophet Inequality, and Random Bipartite Matching.** with Ioannis Caragiannis, Nick Gravin, Zihe Wang, WINE 2021.

10. **Strategyproof Mechanism for Two Heterogeneous Facilities with Constant Approximation Ratio.** with Minming Li, Yuhao Yao, and Jialin Zhang, IJCAI 2020.

11. **Approximability of the eight-vertex model.** with Jin-Yi Cai Tianyu Liu, and Jing Yu, CCC 2020.

12. **Zeros of ferromagnetic two-spin systems.** with Heng Guo, Jingcheng Liu, SODA 2020.

13. **Tight Approximation Ratio of Anonymous Pricing.** with Yaonan Jin, Qi Qi, Zhihao Gavin Tang and Tao Xiao, STOC 2019.

14. **Optimal Budget-Feasible Mechanisms for Additive Valuations** with Nick Gravin, Yaonan Jin and Chenhao Zhang, EC 2019.

15. **Revenue Maximization with Imprecise Distribution.** with Yingkai Li and Haoran Ye, AAMAS 2019.

16. **Zeros of Holant problems: locations and algorithms.** with Heng Guo, Chao Liao and Chihao Zhang, SODA 2019.

17. **Approximability of the Six-vertex Model.** with Jin-Yi Cai and Tianyu Liu, SODA 2019.

18. **Correlation-Robust Analysis of Single Item Auction.** with Xiaohui Bei, Nick Gravin and Zhihao Gavin Tang, SODA 2019.

19. **Tight Revenue Gaps among Simple Mechanisms.** with Yaonan Jin, Zhihao Gavin Tang and Tao Xiao, SODA 2019.

20. **Learning Plackett-Luce Mixtures from Partial Preferences.** with Ao Liu, Zhibing Zhao, Chao Liao, Lirong Xia, AAAI 2019

21. **Counting hypergraph colourings in the local lemma regime.** with Heng Guo ,Chao Liao,and Chihao Zhang, STOC 2018.

22. **Facility Location Game with Fractional Preferences.** with Ken C.K. Fong, Minming Li, Taiki Todo and Makoto Yokoo, AAAI 2018.

23. **Separation in Correlation-Robust Monopolist Problem with Budget.** with Nick Gravin, SODA 2018.

24. **The Value of Information Concealment.** with Hu Fu, Chris Liaw and Zhihao Gavin Tang, SODA 2018.

25. **Dichotomy for Real Holant^c Problems.** Jin-Yi Cai and Mingji Xia, SODA 2018.

26. **Liquid Welfare Maximization in Auctions with Multiple Items.** with Tao Xiao, SAGT 2017.

27. **FPTAS for Counting Proper Four Colorings on Cubic Graphs.** with Kuan Yang ,Chihao Zhang,and Minshen Zhu, SODA 2017.

28. **Combinatorial Multi-Armed Bandit with General Reward Functions.** with Wei Chen, Wei Hu, Fu Li, Jian Li, Yu Liu, NIPS 2016.

29. **Uniqueness, Spatial Mixing, and Approximation for Ferromagnetic 2-Spin Systems.** with Heng Guo, RANDOM 2016.

30. **FPTAS for Hardcore and Ising Models on Hypergraphs.** with Kuan Yang and Chihao Zhang, STACS 2016.

31. **Canonical Paths for MCMC: from Art to Science.** with Lingxiao Huang and Chihao Zhang, SODA 2016.

32. **FPTAS for #BIS with Degree Bounds on One Side.** with Jingcheng Liu, STOC 2015.

33. **Improved Efficiency Guarantees in Auctions with Budgets.** with Tao Xiao, EC 2015.

34. **Competitive analysis via benchmark decomposition.** with Ning Chen and Nick Gravin, EC 2015.

35. **FPTAS for Counting Monotone CNF.** with Jingcheng Liu, SODA 2015.

36. **FPTAS for Counting Weighted Edge Covers.** with Jingcheng Liu and Chihao Zhang, ESA 2014.

37. **The Complexity of Ferromagnetic Two-spin Systems with External Fields.** with Jingcheng Liu and Chihao Zhang, RANDOM 2014.

38. **FPTAS for Weighted Fibonacci Gates and Its Applications.** with Menghui Wang and Chihao Zhang, ICALP 2014.

39. **Optimal Competitive Auctions.** with Ning Chen and Nick Gravin, STOC 2014.

40. **A Simple FPTAS for Counting Edge Covers** Chengyu Lin and Jingcheng Liu, SODA 2014.

41. **Truthful Generalized Assignments via Stable Matching.** with Ning Chen and Nick Gravin, Mathematics of Operations Research, 2013.

42. **Characterization of Truthful Mechanisms for One-dimensional Single Facility Location Game with Payments.** with Lan Yu, WINE 2013.

43. **Improved FPTAS for Multi-Spin Systems** with Yitong Yin, RANDOM 2013.

44. **Competitive Auctions for Markets with Positive Externalities** with Nick Gravin, ICALP 2013.

45. **The Complexity of Approximating Conservative Counting CSPs.** with Xi Chen, Martin Dyer, Leslie Ann Goldberg, Mark Jerrum, Colin McQuillan and David Richerby, STACS 2013.

46. **Correlation Decay up to Uniqueness in Spin Systems.** with Liang Li and Yitong Yin, SODA 2013.

47. **Dichotomy for Holant* Problems with a Function on Domain Size 3.** with Jin-Yi Cai and Mingji Xia, SODA 2013.

48. **On Optimal Differentially Private Mechanisms for Count-Range Queries.** with Chen Zeng, Jin-Yi Cai, and Jeffrey Naughton, ICDT 2013.

49. **A Dichotomy for Real Weighted Holant Problems.** with Sangxia Huang, CCC 2012.

50. **Budget Feasible Mechanism Design: From Prior-Free to Bayesian.** with Xiaohui Bei, Ning Chen and Nick Gravin, STOC 2012.

51. **Computing the Nucleolus of Matching, Cover and Clique Games.** with Ning Chen and Hongyang Zhang, AAAI 2012.

52. **Inapproximability After Uniqueness Phase Transition in Two-Spin Systems.** with Jin-Yi Cai, Xi Chen and Heng Guo. COCOA 2012.

53. **Approximate Counting via Correlation Decay in Spin Systems.** with Liang Li and Yitong Yin, SODA 2012.

54. **On the Approximation Ratio of k-lookahead Auction.** with Xue Chen, Guangda Hu and Lei Wang, WINE 2011.

55. **Optimal Pricing in Social Networks with Incomplete Information.** with Wei Chen, Xiaorui Sun, Bo Tang, Yajun Wang and Zeyuan Allen Zhu, WINE 2011.

56. **The Complexity of Symmetric Boolean Parity Holant Problems.** with Heng Guo and Leslie Valiant, ICALP 2011.

57. **Non-negatively Weighted #CSPs: An Effective Complexity Dichotomy.** with Jin-Yi Cai and Xi Chen, CCC 2011.

58. **The Complexity of Weighted Boolean #CSP Modulo k.** with Heng Guo, Sangxia Huang, and Mingji Xia, STACS 2011.

59. **Dichotomy for Holant* Problems of Boolean Domain.** with Jin-yi Cai and Mingji Xia, SODA 2011.

60. **On the Approximability of Budget Feasible Mechanisms.** with Ning Chen and Nick Gravin, SODA 2011.

61. **Envy-free Pricing with General Supply Constraints.** with Sungjin Im and Yajun Wang, WINE 2010.

62. **From Holant To #CSP And Back: Dichotomy For Holant^c Problems.** with Jin-Yi Cai and Sangxia Huang, ISAAC 2010.

63. **Holographic Algorithms with Matchgates Capture Precisely Tractable Planar #CSP.** with Jin-Yi Cai and Mingji Xia, FOCS 2010.

64. **On Tractable Exponential Sums.** with Jin-Yi Cai, Xi Chen and Richard Lipton, FAW 2010.

65. **Graph Homomorphisms with Complex Values: A Dichotomy Theorem.** with Jin-Yi Cai and Xi Chen, ICALP 2010.

66. **Asymptotically Optimal Strategy-Proof Mechanisms for Two-Facility Games.** with Xiaorui Sun, Yajun Wang and Zeyuan Allen Zhu, ACM EC 2010.

67. **On 2-Player Randomized Mechanisms for Scheduling.** WINE 2009.

68. **Tighter Bounds for Facility Games.** with Yajun Wang and Yuan Zhou, WINE 2009.

69. **Holant Problems and Counting CSP.** with Jin-Yi Cai and Mingji Xia, STOC 2009.

70. **A Computational Proof of Complexity of Some Restricted Counting Problems.** with Jin-Yi Cai and Mingji Xia, TAMC 2009.

71. **Worst-Case Nash Equilibria in Restricted Routing.** with Changyuan Yu, WINE 2008.

72. **Randomized Truthful Mechanisms for Scheduling Unrelated Machines.** with Changyuan Yu, WINE 2008.

73. **Signature Theory in Holographic Algorithms.** with Jin-Yi Cai, ISAAC 2008.

74. **Holographic Algorithms by Fibonacci Gates and Holographic Reductions for Hardness.** with Jin-Yi Cai and Mingji Xia, FOCS 2008.

75. **An Improved Randomized Truthful Mechanism for Scheduling Unrelated Machines.** with Changyuan Yu, STACS 2008.

76. **Holographic Algorithms with Unsymmetric Signatures.** with Jin-Yi Cai , SODA 2008.

77. **On Block-wise Symmetric Signatures for Matchgates.** with Jin-Yi Cai, FCT 2007.

78. **Holographic Algorithms: The Power of Dimensionality Resolved.** with Jin-Yi Cai, ICALP 2007.

79. **Holographic Algorithms: From Art to Science.** with Jin-Yi Cai, STOC 2007.

80. **Bases Collapse in Holographic Algorithms.** with Jin-Yi Cai, CCC 2007.

81. **On the Theory of Matchgate Computations.** with Jin-Yi Cai and Vinay Choudhary, CCC 2007.

82. **On Symmetric Signatures in Holographic Algorithms.** with Jin-Yi Cai, STACS 2007.

83. **Truthful Auctions with Optimal Profit.** with Shang-Hua Teng and Changyuan Yu, WINE 2006.

84. **Simulating Undirected st-Connectivity Algorithms on Uniform JAGs and NNJAGs.** with jialin zhang, Chung Keung Poon, Jin-Yi Cai, ISAAC 2005.

Honors and Awards

- **ICCM Silver Medal 2019**
  The ICCM Medal of Mathematics is awarded to outstanding mathematicians of Chinese descent to encourage them in their pursuit of mathematical truth. Up to six medals, two gold and four silver, are awarded every three years at the International Congress of Chinese Mathematicians (ICCM). A committee of internationally renowned mathematicians, chaired by Professor Shing-Tung Yau, selects the medalists.

- **ACM Distinguished Member 2019**
  The Distinguished Members Grade recognizes those ACM members with at least 15 years of professional experience and 5 years of continuous Professional Membership who have achieved significant accomplishments or have made a significant impact on the computing field. Pinyan Lu is awarded for his Outstanding Scientific Contributions to Computing.

- **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 EC 2022

- Program Committee Member of SODA 2021

- Program Committee Member of ICALP 2020

- Program Committee co-Chair of ISAAC 2019

- Program Committee co-Chair of FAW 2018

- Program Committee co-Chair of WINE 2017

- Program Committee Member of ICALP 2017

- Program Committee Member of FAW 2016

- Program Committee Member of WINE 2016

- Program Committee Member of ESA 2016

- Program Committee Member of ICALP 2015

- Program Committee Member of FOCS 2015

- Program Committee Member of ICALP 2015

- Program Committee co-Chair for Poster track of WINE 2014

- Program Committee Member of ISAAC 2014

- Program Committee Member of STOC 2013

- Program Committee Member of TAMC 2013

- Program Committee co-Chair of FAW-AAIM 2012

- Program Committee Member of ICALP 2012

- Program Committee Member of CATS 2012

- Program Committee Member of WINE 2011

- Program Committee Member of COCOON 2011

- Program Committee Member of FAW-AAIM 2011

- Program Committee Member of FAW 2010

Invited Seminars and Talks

- **Correlation-Robust Mechanism Design**   Sep. 12, 2018
  Invited talk at SAGT 2018   Beijing, China

- **Approximate Counting via Correlation Decay** Apr. 20, 2017
  Invited talk at TAMC 2017 Bern, Switzerland

- **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**
  Dagstuhl Seminar On CSP. Nov 8, 2012. Dagstuhl, Germany

- **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