

## Zizhuo Wang

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CONTACT INFORMATION	111 Church Street SE Minneapolis, MN, 55455	E-mail: <a href="mailto:zwang@umn.edu">zwang@umn.edu</a> Homepage: <a href="http://www.menet.umn.edu/~zwang">http://www.menet.umn.edu/~zwang</a>
ACADEMIC POSITIONS	<b>University of Minnesota</b> , Minneapolis, MN <ul style="list-style-type: none"><li>Assistant Professor, Department of Industrial and Systems Engineering</li></ul>	Aug. 2012-
EDUCATION	<b>Stanford University</b> , Stanford, CA Ph.D., Management Science and Engineering. Advisor: Yinyu Ye. M.S., Mathematical Finance, Jun. 2011.  <b>Tsinghua University</b> , Beijing, China B.S., Mathematical Sciences.	Sept. 2007 - Jun. 2012  Sept. 2003 - Jul. 2007
RESEARCH INTERESTS	Pricing and revenue management, operations management, data-driven decision making, stochastic and robust optimization, internet economics, information markets.	
OTHER PROFESSIONAL EXPERIENCE	<b>IBM. T. J. Watson Research Center</b> , Yorktown Heights, NY <ul style="list-style-type: none"><li>Research intern in supply chain analytics and architecture group.</li><li>Develop and test bundle pricing models for IBM products.</li></ul> <b>Janestreet Capital LLC</b> , New York City, NY <ul style="list-style-type: none"><li>Assistant quantitative researcher and trader.</li><li>Build and test quantitative models for high frequency financial data using time series analysis.</li></ul> <b>The Chinese University of Hong Kong</b> , Hong Kong <ul style="list-style-type: none"><li>Visiting Scholar, Department of Systems Engineering and Engineering Management.</li></ul>	Jun. 2011 - Sept. 2011  Jun. 2010 - Aug. 2010  Aug. 2009 - Sept. 2009
JOURNAL PUBLICATIONS	Guiyun Feng, Xiaobo Li and <b>Zizhuo Wang</b> . On the Substitutability and Complementarity of Choice Models. <i>Operations Research Letters</i> , 46(1), 141–146, 2017.  Xiao Chen, <b>Zizhuo Wang</b> and Hongsong Yuan. Optimal Pricing for Selling to a Multi-Period Newsvendor. <i>Operations Research Letters</i> , 45(5), 415–420, 2017.  Guiyun Feng, Xiaobo Li and <b>Zizhuo Wang</b> . On the Relationship between Several Discrete Choice Models. <i>Operations Research</i> , 65(6), 1516–1525, 2017.  Kameng Nip, Zhenbo Wang and <b>Zizhuo Wang</b> . Knapsack with Variable Weights Satisfying Linear Constraints. <i>Journal of Global Optimization</i> , 69(3):713–725, 2017.  Ruxian Wang and <b>Zizhuo Wang</b> . Consumer Choice Models with Endogenous Network Effects. <i>Management Science</i> , 63(11): 3944–3960, 2017.  Dongdong Ge, <b>Zizhuo Wang</b> , Lai Wei, and Jiawei Zhang. An Improved Algorithm for Fixed-Hub Single Allocation Problems. <i>Journal of the Operations Research Society of China</i> , 5(3): 319–332, 2017.	

- Zizhuo Wang**. Intertemporal Price Discrimination via Reference Price Effects. *Operations Research*, 64(2):290–296, 2016.
- Chenhao Du, William L. Cooper and **Zizhuo Wang**. Optimal Pricing for a Multinomial Logit Choice Model with Network Effects. *Operations Research*, 64(2):441–455, 2016.
- Kameng Nip, Zhenbo Wang and **Zizhuo Wang**. Scheduling under Linear Constraints. *European Journal of Operational Research*, 253(2):290–297, 2016.
- Zhengliang Xue, **Zizhuo Wang** and Markus Ettl. Pricing Personalized Bundles: A New Approach and An Empirical Study. *Manufacturing and Service Operations Management (M&SOM)*, 18(1):51–68, 2016. Finalist of the 2015 INFORMS Revenue Management and Pricing Section Practice Award.
- Zizhuo Wang** and Yinyu Ye. Hidden-City Ticketing: The Cause and Impact. *Transportation Science*, 50(1): 288–305, 2016.
- Zizhuo Wang**, Peter W. Glynn and Yinyu Ye. Likelihood Robust Optimization for Data-Driven Problems. *Computational Management Science*, 13(2):241–261, 2016.
- Xiao Chen and **Zizhuo Wang**. A Dynamic Learning Algorithm for Online Matching Problems with Concave Returns. *European Journal of Operational Research*, 247(2): 379–388, 2015.
- Zizhuo Wang**. On Solving Convex Optimization Problems with Linear Ascending Constraints. *Optimization Letters*, 9(5): 819–838, 2015.
- Shipra Agrawal, **Zizhuo Wang** and Yinyu Ye. A Dynamic Near-Optimal Algorithm for Online Linear Programming. *Operations Research*, 62(4): 876–890, 2014.
- Zizhuo Wang**, Shiming Deng and Yinyu Ye. Close the Gaps: A Learning-while-Doing Algorithm for Single-Product Revenue Management Problems. *Operations Research*, 62(2): 318–331, 2014.
- Dongdong Ge, Guohua Wan, **Zizhuo Wang** and Jiawei Zhang. A Note on Appointment Scheduling with Piecewise Linear Cost Functions. *Mathematics of Operations Research*, 39(4): 1244–1251, 2014.
- Xiaojun Chen, Dongdong Ge, **Zizhuo Wang** and Yinyu Ye. Complexity of Unconstrained  $L_2$ - $L_p$  Minimization. *Mathematical Programming*, 143(1-2): 371–383, 2014.
- Zizhuo Wang** and Ming Hu. Committed versus Contingent Pricing under Competition. *Production and Operations Management*, 23(11): 1919–1936, 2014.
- Yuhang Liu, **Zizhuo Wang**. A Simple Policy for Multiple Queues with Size-Independent Service Times. *Operations Research Letters*, 41(5): 535–539, 2013.
- Hongyang Chen, Gang Wang, **Zizhuo Wang**, Hing-Cheung So and H. Vincent Poor. Non-line-of-sight Node Localization based on Semi-Definite Programming in Wireless Sensor Networks. *IEEE Transactions on Wireless Communications*, 11(1): 108–116, 2012.
- Shipra Agrawal, Erick Delage, Mark Peters, **Zizhuo Wang** and Yinyu Ye. A Unified Framework for Dynamic Prediction Market Design. *Operations Research*, 59(3): 550–568, 2011.
- Zizhuo Wang**, Song Zheng, Yinyu Ye and Stephen Boyd. Further Relaxations of the Semidefinite Programming Approach to Sensor Network Localization. *SIAM Journal on Optimization*, 19(2): 655–673, 2008.

CONFERENCE  
PROCEEDINGS

Yichen Chen, Dongdong Ge, Mengdi Wang, **Zizhuo Wang**, Yinyu Ye and Hao Yin. Strong NP-Hardness for Sparse Optimization with Concave Penalty Functions. In ICML 17': Proceedings of the 34th International Conference on Machine Learning, 2017.

Shipra Agrawal, Erick Delage, Mark Peters, **Zizhuo Wang** and Yinyu Ye. A Unified Framework for Dynamic Pari-mutuel Information Market Design. In EC 09': Proceedings of the 10th ACM Conference on Electronic Commerce, 2009.

Shipra Agrawal, **Zizhuo Wang** and Yinyu Ye. Parimutual Betting on Permutations. In WINE 08': Proceedings of the 4th Workshop on Internet and Network Economics, 2008.

**Zizhuo Wang** and Yichuan Ding. Real-time Tracking for Sensor Networks via SDP and Gradient Method. In MELT 08': Proceedings of the first ACM International Workshop on Mobile Entity Localization and Tracking in GPS-less Environments, 2008.

PAPERS UNDER  
REVIEW

Chenhao Du, William Cooper and **Zizhuo Wang**. Optimal Worst-Case Pricing for a Logit Demand Model with Network Effects. Under review, 2017.

Yan Liu, William Cooper and **Zizhuo Wang**. Information Provision and Revenue Management in the Presence of Consumer Search Costs. Under review, 2017.

Guiyun Feng, Guangwen Kong and **Zizhuo Wang**. We Are on the Way: Analysis of On-Demand Booking System. Under review, 2017. Honorable Mention in the Best Paper Award in the 10th Conference of the Chinese Scholar Association for Management Science and Engineering (CSAMSE).

Kameng Nip, Zhenbo Wang and **Zizhuo Wang**. Assortment Optimization under a Single Transition Model. Under review, 2017.

Xi Chen, Qihang Lin and **Zizhuo Wang**. Stochastic Optimization via Comparison. Under review, 2016.

Xi Chen and **Zizhuo Wang**. Bayesian Dynamic Learning and Pricing with Strategic Customers. Under review, 2016.

Ming Hu and **Zizhuo Wang**. Secrecy versus Transparency in Sales of Network Goods. Under review, 2016.

Yang Zhan, **Zizhuo Wang** and Guohua Wan. Home Care Routing and Appointment Scheduling with Stochastic Service Durations. Under review, 2016.

Pengyu Qian, **Zizhuo Wang** and Zaiwen Wen. A Composite Risk Measure Framework for Decision Making under Uncertainty. Under review, 2015. Finalist of the 2015 INFORMS Undergraduate Operations Research Prize.

Yiping Yuan, Xiaotong Shen, Wei Pan and **Zizhuo Wang**. Constrained Likelihood for Reconstructing a Directed Acyclic Gaussian Graph. Working Paper, 2015.

PH.D. THESIS

*Dynamic Learning Mechanisms in Revenue Management Problems*, Stanford University, 2012.

RESEARCH  
FUNDING

NSF Research Funding CMMI-1434541, *Learning While Doing Algorithms for Online Decision Making Problems* (Principal Investigator). Total Amount \$285,599. Sep 2014 - Aug 2017.

NSF Research Funding CMMI-1462676, *Revenue Management with Network Effects* (co-Principal

Investigator, Principal Investigator: William L. Cooper). Total Amount \$269,863. Sep 2015 - Aug 2018.

Adobe Digital Marketing Research Award, *Real-Time Learning and Optimization with Applications to Personalized Product/Ad Recommendation*. Total Amount \$25,000. Dec 2017 - Nov 2018.

#### TEACHING

IE 5531 (Engineering Optimization), University of Minnesota, Fall 2017. Eval: 5.64/6.00

IE 3521 (Statistics, Quality and Reliability), University of Minnesota, Fall 2017. Eval: 5.10/6.00

IE 5531 (Engineering Optimization), University of Minnesota, Fall 2016. Eval: 5.60/6.00

IE 5531 (Engineering Optimization), University of Minnesota, Fall 2015. Eval: 5.76/6.00

IE 5080 (Topics in Revenue Management), University of Minnesota, Spring 2015. Eval: 5.89/6.00

IE 3521 (Statistics, Quality and Reliability), University of Minnesota, Spring 2015. Eval: 5.13/6.00

IE 5531 (Engineering Optimization), University of Minnesota, Fall 2014. Eval: 5.44/6.00

IE 3521 (Statistics, Quality and Reliability), University of Minnesota, Spring 2014. Eval: 5.17/6.00

IE 5531 (Engineering Optimization), University of Minnesota, Fall 2013. Eval: 5.56/6.00

IE 4521 (Statistics, Quality and Reliability), University of Minnesota, Spring 2013. Eval: 5.11/6.00

IE 4521 (Statistics, Quality and Reliability), University of Minnesota, Fall 2012. Eval: 4.83/6.00

Teaching Assistant: Linear and Nonlinear Optimization, Stanford University, Fall, 2011.

Course Assistant: Dynamic Programming and Stochastic Control, Stanford University, Winter, 2009.

#### PRESENTATIONS

Assortment Optimization under a Single Transition Model

#### AND INVITED TALKS

- Nanjing University, Nanjing, China, Jul 2017.
- South China University of Technology, Guangzhou, China, Jul 2017.

Revenue Management with Consumer Search Costs

- INFORMS Annual Meeting, Nashville, Nov 2016.

We Are On the Way: Analysis of On-Demand Booking Systems

- The 9th Chinese Scholar Association of Management Science and Engineering (CSAMSE) Conference, Hefei, China, Jul 2016.
- The 9th Chinese Scholar Association of Management Science and Engineering (CSAMSE) Conference, Guangzhou, China, Jul 2017.

Bayesian Dynamic Learning and Pricing with Strategic Customers

- Tsinghua University, Beijing, China, Dec 2015.
- Massachusetts Institute of Technology, Boston, Jan 2016.
- University of Chicago, Chicago, Feb 2016.
- International INFORMS Meeting, Waikoloa Village, Hawaii, Jun 2016.
- MSOM Annual Conference, Auckland, New Zealand, Jul 2016.
- The 9th Chinese Scholar Association of Management Science and Engineering (CSAMSE) Conference, Hefei, China, Jul 2016.

- Hong Kong University of Science and Technology, Hong Kong, Aug 2016.
- Hong Kong Polytechnic University, Hong Kong, Aug 2016.
- Chinese Management Science Young Scholar Symposium, Kunming, China, Dec 2016.

#### Analysis of Choice Models: A Welfare-Based Framework

- MSOM Annual Conference, Toronto, Canada, Jun 2015.
- INFORMS Revenue Management and Pricing Section Conference, New York City, Jun 2016.

#### Introduction to Consumer Choice Models and Its Related Optimization Problem

- Tsinghua University, Beijing, China, May 2015.

#### Consumer Choice Models with Endogenous Network Effects

- POMS Annual Conference, Washington D.C., May 2015.
- Sun Yat-sen University, Guangzhou, China, May 2015.
- INFORMS Revenue Management and Pricing Section Conference, New York City, Jun 2015.
- INFORMS Marketing Science Section Conference, Baltimore, Jun 2015.
- The 8th Chinese Scholar Association of Management Science and Engineering (CSAMSE) Conference, Shenyang, China, Jul 2015.
- INFORMS Annual Meeting, Philadelphia, Nov 2015.
- International INFORMS Meeting, Waikoloa Village, Hawaii, Jun 2016.

#### A Composite Risk Measure Framework for Decision Making under Uncertainty

- Tsinghua University, Beijing, China, Jan 2015.
- Peking University, Beijing, China, May 2015.
- ISMP Conference, Pittsburgh, Jul 2015.

#### Multi-Product Pricing Problem under Network Effects

- INFORMS Revenue Management and Pricing Section Conference, Istanbul, Turkey, Jun 2014.
- Chinese Academy of Sciences, Beijing, China, Aug 2014.

#### Intertemporal Price Discrimination via Reference Price Effects

- MSOM Annual Conference, Seattle, Jun 2014.
- IFORS Conference, Barcelona, Spain, Jul 2014.
- INFORMS Annual Meeting, San Francisco, Nov 2014.

#### Dynamic Learning Algorithms for Online Linear/Non-linear Optimization Problems

- University of Illinois at Urbana-Champaign, Champaign, Oct 2013.
- University of British Columbia, Vancouver, Canada, Mar 2014.
- Peking University, Beijing, China, May 2014.
- Workshop on Trends of Online Algorithms (TONA), Copenhagen, Denmark, Jul 2014.
- Lehigh University, Bethlehem, Aug 2015.

#### A New Approach to Price Personalized Bundles with Distinctive Configuration

- MSOM Annual Conference, Fontainebleau, France, Jul 2013.
- INFORMS Annual Meeting, Minneapolis, Oct 2013.

#### On Solving Convex Optimization Problems with Linear Ascending Constraints

- International Conference on Continuous Optimization (ICCOPT), Lisbon, Portugal, Aug 2013.
- INFORMS Annual Meeting, Minneapolis, Oct 2013.

#### Revenue Management of Network Goods Under Demand Uncertainty

- Mostly OM Conference, Beijing, China, May 2013.
- INFORMS Revenue Management and Pricing Section Conference, Atlanta, Jun 2013.
- Nanjing University, Nanjing, China, Aug 2013.

- INFORMS Annual Meeting, Minneapolis, Oct 2013.

Static versus Contingent Pricing under Competition

- INFORMS Annual Meeting, Phoenix, Oct 2012.
- Huazhong University of Science and Technology, Wuhan, China, Dec 2012.
- University of Minnesota, Minneapolis, Feb 2013.
- MSOM Annual Conference (poster presentation), Fontainebleau, France, Jul 2013.

Hidden-City Ticketing: The Cause and Impact

- INFORMS Annual Meeting, Charlotte, Nov 2011.
- University of Minnesota, Minneapolis, Jan 2012.
- The Chinese University of Hong Kong, Hong Kong, Jan 2012.

A Learning-while-Doing Algorithm for Single-Product Revenue Management Problems

- Shanghai Jiao Tong University, Shanghai, China, Mar 2011.
- Tsinghua University, Beijing, China, Mar 2011.
- MSOM Annual Conference, Ann Arbor, Jun 2011.
- INFORMS Revenue Management and Pricing Section Conference, New York City, Jun 2011.
- INFORMS Annual Meeting, Charlotte, Nov 2011.
- University of Chicago, Chicago, Feb 2012.

A Dynamic Near-Optimal Algorithm for Online Linear Program

- INFORMS Annual Meeting, Austin, Nov 2010.

Likelihood Robust Optimization and its Applications

- INFORMS Annual Meeting, San Diego, Oct 2009.
- Shanghai Jiao Tong University, Shanghai, China, Sept 2010.
- University of Minnesota, Minneapolis, Oct 2012.
- Mathematical Finance Days Conference, Montreal, Canada, Apr 2013.

A Unified Framework for Dynamic Pari-mutuel Information Market Design

- 10th ACM Conference on Electronic Commerce, Stanford, Jul 2009.
- The Chinese University of Hong Kong, Hong Kong, Sep 2009.
- University of Minnesota, Minneapolis, Sep 2014.

PATENTS

- Pricing Personalized Packages with Multiple Commodities. With Pawan R. Chowdhary, Markus R. Ettl, Shivaram Subramanian, and Zhengliang Xue. US20140310064/20140310065.

STUDENTS

Ph.D. Student (First Position)

- Yan Liu (co-advise with William L. Cooper, first position: College of Management and Economics, Tianjin University)
- Xiao Chen (Current)
- Chenhao Du (Current, co-advise with William L. Cooper)
- Guiyun Feng (Current, co-advise with Guangwen Kong)
- Ruizhi Shi (Current)
- Xiaobo Li (Current, co-advise with Shuzhong Zhang)

Master Student (First Position)

- Yuhang Liu (Ph.D. student at University of Wisconsin, Madison)
- Wei Guo (Ph.D. student at University of Washington)
- Yessica Lie (The Walt Disney Company)

Undergraduate Student (First Position)

- Yifan Feng (Ph.D. student at Booth School of Business, University of Chicago)

OTHER  
PROFESSIONAL  
SERVICES

Professional Society

- INFORMS, MSOM, POMS

Conference Organization

- Program co-chair: NSF-IMA Workshop — Industrial Mathematics Clinic, 2017
- Technical program committee: INFORMS Revenue Management and Pricing Section Conference, Amsterdam, 2017.
- Program co-chair: INFORMS International Meeting, Hawaii, 2016
- Session chair: INFORMS Annual Meeting, Phoenix, 2012; INFORMS Marketing Science Section Annual Conference, Baltimore, 2015; INFORMS Annual Meetings, 2015, 2016.

Seminar Coordinator

- University of Minnesota, Spring 2014, Fall 2014 and Spring 2015.

Associate Editor

- Management Science, optimization area, 2017 - present.

Senior Editor

- Production and Operations Management, revenue management area, 2017 - present.

Journal Referees

- |   |   |
|---|---|
| • Operations Research                             | • IEEE Transactions on Automation Science and Engineering |
| • Management Science                              | • IEEE Transactions on Signal Processing                  |
| • Mathematics of Operations Research              | • ACM Transactions on Economics and Computation           |
| • Mathematical Programming                        | • IEEE Transactions on Wireless Communications            |
| • SIAM Journal on Optimization                    | • Technometrics   |
| • Manufacturing and Service Operations Management | • Omega   |
| • Production and Operations Management            | • Optimization Methods and Software                       |
| • Computational Optimization and Applications     | • Naval Research Logistics                                |
| • Sensors   |   |

HONORS AND  
AWARDS

- |  |           |
|--|-----------|
| Adobe Digital Marketing Research Award.  | 2017      |
| Honorable Mention in the Best Paper Award in the 10th Conference of the Chinese Scholar Association for Management Science and Engineering (CSAMSE). | 2017      |
| Finalist of INFORMS Best Undergraduate Research Award (as Instructor)  | 2015      |
| Finalist of INFORMS Revenue Management and Pricing Section Practice Award  | 2015      |
| Stanford Graduate Fellows  | 2008-2011 |
| Outstanding College Student of Beijing   | 2007      |
| Outstanding Graduates of Tsinghua University   | 2007      |
| HSBC Scholarship in Tsinghua University  | 2003-2007 |
| Meritorious Prize for the Mathematical Contest of Modeling (MCM)   | 2006      |
| Outstanding Prize for Chinese University Mathematical Contest of Modeling  | 2005      |