Rui Zhang

Leeds School of Business
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University of Colorado Boulder
Boulder, CO 80309-0419

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—— *Updated on February 13, 2024* ——

Research Interests

Applications:
Optimization Problems on Social Networks, Revenue Management, Routing, and Last-Mile Delivery.

Methodologies:
Network Optimization, Integer Programming,
and Approximate Dynamic Programming (A.K.A. Reinforcement Learning).

Education

Ph.D. in Management Science, Minor in Economics, August 2016
Robert H. Smith School of Business, University of Maryland, College Park

M.S. in Computational Operations Research, College of William & Mary May 2011

M.S. in Computer Science, Bowling Green State University August 2009

B.B.A. in Information Systems, Huazhong University of Science and Technology August 2006

Academic Experience

Leeds School of Business, University of Colorado Boulder

Assistant Professor of Operations Management June 2016 - present

Applied Mathematics & Statistics, and Scientific Computation (AMSC) Program

University of Maryland, College Park

Special Member of the Graduate Faculty May 2022 - May 2027

Robert H. Smith School of Business, University of Maryland, College Park

Instructor of Operations Management & Business Analytics January 2015 - May 2016

Honors and Awards

2024 **Nominee, Joseph L. Frascona Teaching Excellence Award**, Leeds School of Business

2023 **Provost's Faculty Achievement Award**, University of Colorado Boulder

Finalist, Best Paper Award, INFORMS Section on Telecommunications and Network Analytics

Nominee, Best Paper Award, Transportation and Logistics Management Track, the 2023 DSI Meeting

2022 **Runner-Up, INFORMS Computing Society (ICS) Prize**, INFORMS Computing Society

Finalist, Best Paper Award, INFORMS Section on Telecommunications and Network Analytics

Nominee, Joseph L. Frascona Teaching Excellence Award, Leeds School of Business

2016 **Finalist, Best Student Paper Award**, INFORMS Section on Social Media Analytics

Frank T. Paine Award for Academic Achievement, University of Maryland, College Park

Second Prize, Student Excellence Award, Washington DC Chapter of the INFORMS

Abraham Golub Memorial Dissertation Proposal Prize, University of Maryland, College Park

International Conference Student Support Award, University of Maryland, College Park

2015 **National Science Foundation (NSF) Travel Grant**, University of Maryland, College Park

Dean's Fellowship, Robert H. Smith School of Business

Outstanding Graduate Assistant Award, University of Maryland, College Park

2014 **INFORMS Doctoral Colloquium Participant**, INFORMS

Dean's Fellowship, Robert H. Smith School of Business

2013 **Dean's Fellowship**, Robert H. Smith School of Business

The Jeremiah Golden Prize, Robert H. Smith School of Business

2012 **Dean's Fellowship**, Robert H. Smith School of Business

2008 **Professional Development Grant**, Bowling Green State University

2006 **Distinctive Graduate Award**, Huazhong University of Science and Technology

2004 **Outstanding Academic Performance Award**, Huazhong University of Science and Technology

Publications (Authors indicated with "underlined font" are Ph.D. students)

Refereed Journal Papers:

16. The Driver-Aide Problem: Coordinated Logistics for Last-Mile Delivery, with S. Raghavan, *Manufacturing & Service Operations Management*, **26**(1):291-311, 2024.
★ Media Coverage: When does a package delivery company benefit from having two people in the truck? *The Institute for Systems Research, University of Maryland.*
★ **Nominee, Best Paper Award, Transportation and Logistics Management Track, the 2023 DSI Annual Meeting**

15. The Hot Spot Coverage Patrol Problem: Formulations and Solution Approaches, with Y. Luo and B. Golden, *INFORMS Journal on Computing*, **35**(6):1286-1307, 2023.
∗ The instances and source code in this paper can be downloaded here.

14. The Paired Mail Carrier Problem, with Y. Luo, B. Golden, S. Poikonen, and E. Wasil, *European Journal of Operational Research*, **308**(2), 801-817, 2023.

13. Product-Based Approximate Linear Programs for Network Revenue Management, with S. Samiedaluie and D. Zhang, *Operations Research*, **70**(5):2837-2850, 2022.
∗ The NRM instances in this paper can be downloaded here.

12. A Fresh Look at the Traveling Salesman Problem with a Center, with Y. Luo, B. Golden, and S. Poikonen, *Computers & Operations Research*, **143**, 105748, 2022.

11. Rapid Influence Maximization on Social Networks: The Positive Influence Dominating Set Problem, with S. Raghavan, *INFORMS Journal on Computing*, **34**(3):1345-1365, 2022.
★ Finalist, Best Paper Award, INFORMS Section on Telecommunications and Network Analytics, 2023
∗ The PIDS instances in this paper can be downloaded here.

10. Influence Maximization with Latency Requirements on Social Networks, with S. Raghavan, *INFORMS Journal on Computing*, **34**(2):710-728, 2022.
★ Selected as a Feature Article by the Editor-in-Chief
★ Finalist, Best Paper Award, INFORMS Section on Telecommunications and Network Analytics, 2022
∗ The PIDS-PP instances in this paper can be downloaded here.

9. Weighted Target Set Selection on Trees and Cycles, with S. Raghavan, *Networks*, **77**(4):587-609, 2021.

8. A Branch-and-Cut Approach for the Least Cost Influence Problem on Social Networks, with D. Günneç and S. Raghavan, *Networks*, **76**(1):84-105, 2020.

7. Least Cost Influence Maximization on Social Networks, with D. Günneç and S. Raghavan, *INFORMS Journal on Computing*, **32**(2):289-302, 2020.

6. A Branch-and-Cut Approach for the Weighted Target Set Selection Problem on Social Networks, with S. Raghavan, *INFORMS Journal on Optimization*, **1**(4):304-322, 2019.
∗ The WTSS instances in this paper can be downloaded here.

5. A Hybrid Heuristic Procedure for the Windy Rural Postman Problem with Zigzag Time Windows, with O. Lum, B. Golden, and E. Wasil, *Computers & Operations Research*, **88**, 247-257, 2017.

4. The Windy Rural Postman Problem with a Time-Dependent Zigzag Option, with J. Nossack, B. Golden, and E. Pesch, *European Journal of Operational Research*, **258**(3), 1131-1142, 2017.

3. The Min-Max Split Delivery Multi-Depot Vehicle Routing Problem with Minimum Service Time Requirement, with X. Wang, B. Golden, and E. Wasil, *Computers & Operations Research*, **71**, 110-126, 2016.

2. Robust Optimization Model for Runway Configuration Management, with R. Kincaid, *International Journal of Operations Research and Information Systems*, **5**(3), 1-26, 2014.

1. Rectangles Algorithm for Generating Normal Variates, with L. Leemis, *Naval Research Logistics*, **59**(1), 52-57, 2012.

Refereed Conference Proceedings:

2. Routing Problems with Time Dependencies or How Different Are Trash Collection or Newspaper Delivery from Street Sweeping or Winter Gritting?, with J. Nossack, B. Golden, and E. Pesch, *7th International Conference on Engineering, Project, and Production Management*, 21 - 23 September 2016, Bialystok, Poland.

1. Robust Optimization Model for Runway Configuration Management, with R. Kincaid, *the Proceedings of the 11th AIAA Aviation Technology, Integration, and Operations (ATIO) Conference*, September 20-22 2011, Virginia Beach, VA, AIAA.

Papers Under Review/Revision:

5. On Approximate Linear Programming for a Queueing Control Problem, with S. Samiedaluie and D. Zhang, *Computers & Operations Research*. Under review.

4. Branch-Cut-and-Price for the Capacitated Autonomous Vehicle Assisted Delivery Problem, *INFORMS Journal on Computing*. Major revision.

3. Assortment Optimization for Online Video Games, with F. You and T. Vossen, *Production and Operations Management*. Under review.
2. Joint Dynamic Optimization of Pricing and Personalized Recommendations in Online Retailing, with Y. Lei, Z. Jiang, and D. Zhang. *Management Science*. Under review.
1. The Driver-Aide Problem in Urban Areas, with M. Chao, A. Masone, and B. Golden. *Production and Operations Management*. Under review.

Working Papers/Manuscripts in Preparation:

6. Probabilistic Approximations for Network Revenue Management, with S. Samiedaluie and D. Zhang, Manuscripts in preparation for submission to *Manufacturing & Service Operations Management*.
5. The Role of Public Companies in the Polarization of American Politics, with S. Robinson, J. Rogers, N. Skinner, and L. Wellman. Paper in development for *The Accounting Review*.
4. Joint Learning and Optimization for Influence Maximization on Social Networks, with H. Zhang. Paper in development for *Manufacturing & Service Operations Management*.
3. Approximate Linear Programming for Network Revenue Management: A Review and Recent Developments, with S. Samiedaluie and D. Zhang. Paper in development for *Operations Research*.
2. An Approximate Dynamic Programming Approach for Congestion-dependent Pricing of Queuing Services, with S. Samiedaluie and D. Zhang. Paper in development for *INFORMS Journal on Computing*.
1. First-order Methods for Finding Weighted Graphs with Maximum Algebraic Connectivity, with M. Lewis and D. Phillips. Paper in development for *Mathematical Programming*.

Teaching Experience

University of Colorado Boulder ($\star$ new course developed)

$\star$ MSBC5160 Machine Learning in Python (MBA/MS level)

– Fall 2021 (3 sections), Fall 2022 (3 sections)

MBAX6843 Supply Chain Analytics (MBA/MS level)

– Fall 2021, Spring 2021, Spring 2020, Spring 2019, Spring 2018, Spring 2017

MGMT4120 Managing Business Processes (Junior/Senior level)

– Spring 2021 (2 sections), Spring 2020 (2 sections), Spring 2019 (2 sections), Spring 2018 (2 sections)

$\star$ OPIM8820 Large-Scale Optimization (Ph.D. level)

– Spring 2017

University of Maryland, College Park

BMGT434 Introduction to Optimization (Senior level)

– Spring 2016, Spring 2015

Invited Seminars/Workshops

Paul Merage School of Business, University of California-Irvine, May 2023

Operations Research with Engineering (ORwE), Colorado School of Mines, August 2022

Nebraska College of Business, University of Nebraska-Lincoln, January 2022

CU Denver Business School, University of Colorado Denver, February 2020

Rocky Mountain Chapter Seminar, INFORMS, January 2020

Department of Mathematics, College of William & Mary, April 2017

Leeds School of Business, University of Colorado Boulder, January 2016

Conference Presentations (⋆: as the presenting author, •: presented by co-authors)

Assortment Optimization for Online Multiplayer Video Games, with F. You and T. Vossen.

⋆ Manufacturing and Service Operations Management Conference 2023, Montreal, Canada, June 24 - 26, 2023.

Probabilistic Approximations for Network Revenue Management, with S. Samiedaluie and D. Zhang.

⋆ POMS 33rd Annual Conference, Orlando, Florida, May 21 - 25, 2023.

• INFORMS Annual Meeting, Indianapolis, IN, October 16-19, 2022.

The Driver-Aide Problem: Coordinated Logistics for Last-mile Delivery, with S. Raghavan.

• Manufacturing and Service Operations Management Conference 2022, Munich, Germany, June 26 - 28, 2022.

• International Network Optimization Conference (INOC) 2022, RWTH Aachen University, Aachen, Germany, June 7-10, 2022.

⋆ 2022 CORS/INFORMS International Conference, June 5-8, 2022.

⋆ POMS 32nd Annual Conference, Online, April 21 - 25, 2022.

• MIE Seminar Series, Northeastern University, March 25, 2022.

• 2022 INFORMS Computing Society Conference, Tampa, Florida, January 23-25, 2022.

Approximate Linear Programming for a Queueing Admission Control Problem, with S. Samiedaluie and D. Zhang.

• 2021 CORS Annual Conference, June 7-10, 2021.

Product-Based Approximate Linear Programs for Network Revenue Management, with S. Samiedaluie and D. Zhang.

⋆ INFORMS Annual Meeting, Indianapolis, IN, October 16-19, 2022.

⋆ 2022 INFORMS Revenue Management and Pricing (RMP) Section Conference, Booth School of Business, University of Chicago, June 20 - 22, 2022.

• 2022 CORS/INFORMS International Conference, June 5-8, 2022.

⋆ POMS 31th Annual Conference, online, April 30-May 5, 2021.

⋆ 2021 Manufacturing and Service Operations Management Conference, Kelley School of Business, Indiana University, June 7-10, 2021.

⋆ 2021 INFORMS Revenue Management and Pricing (RMP) Section Conference, Carey Business School, Johns Hopkins University, June 28 - 30, 2021.

Influence Maximization with Latency Requirements on Social Networks, with S. Raghavan.

• **INFORMS Telecommunications and Network Analytics Section Best Paper Award**, Indianapolis, IN, October 16-19, 2022.

Rapid Influence Maximization on Social Networks: The Positive Influence Dominating Set Problem, with S. Raghavan.

⋆ INFORMS Annual Meeting, National Harbor, MD, November 8-11, 2020 (online due to COVID-19).

• 15th INFORMS Telecommunications and Network Analytics Conference, Berlin, Germany, October 20-21, 2020 (online due to COVID-19).

• Applied Optimisation Arena Seminar, Department of Information Technology, Uppsala University, November 25, 2020.

Finite-Horizon Decomposition for an Infinite-Horizon Dynamic Capacity Allocation Problem, with T. Vossen.

⋆ POMS 30th Annual Conference, Washington DC, May 2-6, 2019.

⋆ INFORMS Annual Meeting, Seattle, WA, October 20-23, 2019.

Weighted Target Set Selection Problem on Cycles, with S. Raghavan.

⋆ INFORMS Annual Meeting, Phoenix, AZ, November 3-7, 2018.

⋆ INFORMS Optimization Society Conference, University of Colorado, Denver, CO, March 23-25, 2018.

Origin-Destination Based Approximations for Network Revenue Management, with D. Zhang.

⋆ INFORMS Annual Meeting, Houston, TX, October 22-25, 2017.

⋆ POMS 28th Annual Conference, Seattle, WA, May 5-8, 2017.

The One Time Period Least Cost Influence Maximization Problem on Social Networks, with S. Raghavan.

⋆ INFORMS Annual Meeting, Houston, TX, October 22-25, 2017.

• 8th International Network Optimization Conference, Lisbon, Portugal, Feb 26-28, 2017.

Least Cost Influence Maximization on Trees and Cycles, with S. Raghavan.

⋆ 15th INFORMS Computing Society Conference, Austin, TX, January 15-17, 2017.

A Hybrid Heuristic Procedure for the Windy Rural Postman Problem with Time-Dependent Zigzag Service, with O. Lum, B. Golden, and E. Wasil.

• INFORMS Annual Meeting, Nashville, TN, November 13-16, 2016.

• 2nd Workshop on Arc Routing Problems, Lisbon, Portugal, May 22-26, 2016.

Mathematical Programming Approaches to Influence Maximization Problems on Social Networks, with S. Raghavan.

⋆ Summer Brown-Bag Seminar, Leeds School of Business, University of Colorado Boulder, 2017.

⋆ INFORMS Annual Meeting, Nashville, TE, November 13-16, 2016.

⋆ **WINFORMS Student Excellence Award Competition**, INFORMS, DC, April 19, 2016.

• **Plenary Talk**, INFORMS Telecommunications Conference, Boca Raton, FL, March 20-22, 2016.

Weighted Target Set Selection on Social Networks, with S. Raghavan.

⋆ **INFORMS Social Media Analytics Best Student Paper Award**, Nashville, TN, November 13-16, 2016.

⋆ **Second Prize, Student Excellence Award**, Washington DC Chapter of INFORMS, 2016.

⋆ INFORMS Optimization Society Conference, Princeton University, Princeton, NJ, March 17-19, 2016.

⋆ 22nd International Symposium on Mathematical Programming, Pittsburgh, PA, July 12-17, 2015.

⋆ 14th INFORMS Computing Society Conference, Richmond, VA, January 11-13, 2015.

⋆ INFORMS Annual Meeting, San Francisco, CA, November 9-12, 2014.

Generalizations of the Dominating Set Problem on Social Networks, with S. Raghavan.

⋆ 16th INFORMS Computing Society Conference, Knoxville, TN, January 6-8, 2019.

⋆ INFORMS Annual Meeting, Phoenix, AZ, November 3-7, 2018.

⋆ INFORMS Optimization Society Conference, University of Colorado, Denver, CO, March 23-25, 2018.

• 21st Conference of the International Federation of Operational Research Societies, Quebec City, Canada, July 17-21, 2017.

⋆ INFORMS Annual Meeting, Philadelphia, PA, November 1-4, 2015.

Tailored Incentives and Least Cost Influence Maximization on Social Networks, with S. Raghavan.

⋆ INFORMS Annual Meeting, Philadelphia, PA, November 1-4, 2015.

The Positive Influence Dominating Set Polytope, with S. Raghavan.

• 22nd International Symposium on Mathematical Programming, Pittsburgh, PA, July 12-17, 2015.

• 7th International Network Optimization Conference, Warsaw, Poland, May 18-20, 2015.

The Windy Rural Postman Problem with a Time-Dependent Zigzag Option, with J. Nossack, B. Golden, and E. Pesch.

⋆ INFORMS Annual Meeting, Philadelphia, PA, November 1-4, 2015.

• IEEE SSCI 2015, Cape Town, South Africa, December 7-10, 2015.

• Logistikmanagement 2015, Braunschweig, Germany, September 16-18, 2015.

• OR2015, Vienna, Austria, September 1-4, 2015.

• 3rd VeRoLog, Oslo, Norway, June 22-25, 2014.

Solving Semidefinite Programs over Symmetric, Diagonally Dominant Matrices, with M. Lewis and D. Phillips.

• INFORMS Annual Meeting, San Francisco, CA, November 9-12, 2014.

A Tight Extended Formulation for the Weighted Target Set Selection Problem on Trees, with S. Raghavan.

• 3rd International Symposium on Combinatorial Optimization, Lisbon, Portugal, 2014.

Engineering Diffusion on a Social Network at Minimum Cost, with S. Raghavan.

⋆ 3rd International Symposium on Combinatorial Optimization, Lisbon, Portugal, 2014.

Weighted and Fractional Versions of the Target Set Selection Problem on Trees, with S. Raghavan.

• Capital Area Theory Seminar, Department of Computer Science, University of Maryland, April 2014.

The Least Cost Influence Problem, with D. Günneç and S. Raghavan.

⋆ 20th IFORS Conference, Barcelona, Spain, July 13-18, 2014.

• EURO/INFORMS Joint International Meeting, Rome, Italy, July 1-4, 2013.

• 6th International Network Optimization Conference, Tenerife, Spain, May 20-22, 2013.

⋆ 13th INFORMS Computing Society Conference, Santa Fe, NM, January, 2013.

• Intelligent Automation, Inc. Colloquia Series, Institute for Systems Research, University of Maryland, November, 2012.

Robust Optimization Models for Runway Configuration Management, with R. Kincaid.

• AIAA-ATIO Conference, Virginia Beach, VA, September 20-22, 2011.

⋆ 12th INFORMS Computing Society Conference, Monterey, CA, January, 2011.

⋆ 10th Graduate Research Symposium, College of William & Mary, Williamsburg, VA, March, 2011.

First-order Methods for Maximizing Algebraic Connectivity of Weighted Graphs, with A. Papir and D. Phillips.

⋆ Modeling and Optimization: Theory and Applications (MOPTA) 2011, Lehigh University , Bethlehem, PA, August, 2011.

⋆ 12th INFORMS Computing Society Conference, Monterey, CA, January, 2011.

• Discrete Math Seminar, Columbia University. December 2010. New York, NY.

Students

Advisor/Research Supervisor

Mengting Chao, 2022 – present, Ph.D. in the AMSC program, University of Maryland, College Park.

Yuchen Luo, 2020 – 2022, Ph.D. in the AMSC program, University of Maryland, College Park. First position: Bain & Company.

Taylor Egner, 2021 – 2022, M.S. in Operations, University of Colorado Boulder. First position: Laminaar Aviation Infotech.

Committee Member

Hasti Rahemi, 2019 – 2023, Ph.D. in Operations, University of Colorado Boulder. First position: University of Wisconsin-Whitewater.

Fan You, 2018 – 2022, Ph.D. in Operations, University of Colorado Boulder. First position: Uber Technologies.

Mentor

Shanava Saintolien, Spring 2023, Diverse Doctorates in Business program.

Service

External Service

Editorial Service

Associate Editor, *Networks*, 2020 – present.

Journal Reviewer (over 70 times)

Operations Research, Manufacturing & Service Operations Management,
INFORMS Journal on Computing, Production and Operations Management,
SIAM Journal on Optimization, Networks, IIE Transactions, Transportation Research Part E,
Journal of Global Optimization, Asia-Pacific Journal of Operational Research,
Omega: The International Journal of Management Science, Algorithms.

Conference Reviewer

24th Conference on Integer Programming and Combinatorial Optimization, 2023.

2020 INFORMS Manufacturing and Service Operations Management Conference.

Community Service

Elected Council Member

INFORMS Telecommunications and Network Analytics Section, 2021 – present.

Judge

The Poster Competition, INFORMS Annual Meeting 2022.

INFORMS Data Mining Section Best Paper Award, 2023.

Conference Organization

Chair of Publications

16th INFORMS Telecommunications Conference, 2024.

Cluster Chair

Telecommunications and Network Analytics Section, INFORMS Annual Meeting 2022.

Session Chair

Production and Operations Management Society Meeting 2017, 2019, 2020, 2021, 2022.
INFORMS Computing Society Conference 2019.
INFORMS Optimization Society Conference 2018.
INFORMS Annual Meeting 2017, 2021, 2022.

Internal Service

Leeds School of Business, University of Colorado

Ph.D. Program Director in Operations Management, Fall 2017 – 2023.

Doctoral Curriculum and Policy Committee, Fall 2017 – 2023.

Organizer, Operations Management Seminar Series, 2018 – 2020.

Leeds Executive Committee, 2018 – 2020.

Engineering Collaboration Committee, 2018 – 2020.

Primary Unit Evaluation Committee for

Reappointment of Keith Stockton, Fall 2017

Reappointment of Tim Rodger, Fall 2018 (Chair)

Reappointment of Gregg Macaluso, Fall 2019, 2022

Operations Management Faculty Search Committee, 2017, 2018 (chair), 2019, 2022.

Industry/Consulting Experience

RouteSmart Technologies, Columbia, Maryland.

Hema Fresh, Alibaba Group, China

Professional Affiliations

Institute for Operations Research and the Management Sciences (INFORMS)
Mathematical Optimization Society
INFORMS Manufacturing and Service Operations Management Society (MSOM)
INFORMS Computing Society
INFORMS Transportation Science and Logistics Society
INFORMS Telecommunications and Network Analytics Section
INFORMS Service Science Section
INFORMS Social Media Analytics Section

Languages

English (Proficient), Mandarin Chinese (Native Speaker).