AKANG WANG

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EDUCATION

Carnegie Mellon University (CMU) Pittsburgh, USA
Doctor of Philosophy in Chemical Engineering (Process Systems Engineering) *Aug. 2015 - May 2020*
Thesis Title: Optimization Algorithms for Vehicle Routing and Packing Problems
Thesis Committee: Chrysanthos E. Gounaris (advisor), Ignacio E. Grossmann, Nikolaos V. Sahinidis, Willem-Jan Van Hoeve, Alexandre Jacquillat, and Jeffrey E. Arbogast

Tianjin University (TJU) Tianjin, China
Bachelor of Science in Chemical Engineering *Sept. 2011 - Jul. 2015*

Nankai University Tianjin, China
Bachelor of Arts in Finance (Minor) *Jan. 2013 - Jul. 2015*

WORK EXPERIENCE

Shenzhen Research Institute of Big Data (SRIBD) Shenzhen, China
Research Scientist *Jun. 2021 - Present*

The Chinese University of Hong Kong, Shenzhen Shenzhen, China
Adjunct Assistant Professor at School of Data Science *Jun. 2024 - Present*

DiDi Beijing, China
Algorithm Engineer *Aug. 2020 - Jun. 2021*

RESEARCH EXPERIENCE

Optimization Solver Development Lab, SRIBD *Jun. 2021 - Present*

Mixed-Integer Linear Programming

1. **PI**, Solving Stochastic Mixed-Integer Programs via Enhanced Benders Decomposition Methods, **Guangdong Basic and Applied Basic Research Foundation**（广东省基础与应用基础研究基金面上项目）[Grant No. 2024A1515010306], RMB 150,000 *Jan. 2024 - Dec. 2026*
2. Participant, General Optimization Models, Theories, Algorithms and Applications for Complex Systems, **National Key R&D Program of China**（国家重点研发计划）[Grant No. 2023YFA1009300] *Dec. 2023 - Nov. 2028*
3. Participant, Mixed-Integer Linear Programming Solver Development, SRIBD *Oct. 2022 - Sept. 2024*
4. Participant, Linear Programming Solver Development, SRIBD *Jun. 2021 - Sept. 2023*

Learning to Optimize

1. Participant, Theory and Methods of Learning to Optimize and Its Applications to 5G Network, **National Key R&D Program of China**（国家重点研发计划）[Grant No. 2022YFA1003900] *Dec. 2022 - Nov. 2027*
2. **Co-PI**, Learning-Enhanced Optimization Algorithms for Large-Scale Mixed-Integer Linear Programs, Huawei *Sept. 2021 - Sept. 2022*
3. Participant, Efficient Primal Heuristics for Mixed-Integer Linear Programs, NeurIPS 2021 ML4CO Competition *Jul. 2021 - Oct. 2021*

Grid Optimization

1. **PI**, Enhanced Mixed-Integer Programming Techniques for Security-Constrained Unit Commitment, **Natural Science Foundation of China**（国家自然科学基金青年科学基金项目）[Grant No. 12301416], RMB 300,000 *Jan. 2024 - Dec. 2026*
2. **PI**, Efficient Algorithms and Strong Relaxations for Security-Constrained Alternating Current Optimal Power Flow, **Shenzhen Science and Technology Program**（深圳市优秀科技创新人才培养博士启动项目）[Grant No. RCBS20221008093309021], RMB 300,000 *Apr. 2023 - Mar. 2025*

Transportation & Logistics

1. Participant, A Hierarchical Decomposition Approach for Railway Disruption Recovery, INFORMS 2022 RAS Problem Solving Competition *Jul. 2022 - Oct. 2022*

Ph.D. Research, Process Systems Engineering, CMU *Aug. 2015 - May 2020*

JOURNAL PAPERS

1. A. Izadkhah, **A**. **Wang**, J. M. Lainez-Aguirre, J. M. Pinto, and C. E. Gounaris. Periodic vehicle routing problem with multi-day trips. *Under Review*, 2024
2. **A**. **Wang**, X. Li, J. E. Arbogast, Z. Wilson, and C. E. Gounaris. A novel mixed-integer linear programming formulation for continuous-time inventory routing. *arXiv*, 2023b
3. V. A. Silva, **A**. **Wang**, V. J. M. Ferreira Filho, and C. E. Gounaris. Routing and scheduling of platform supply vessels in offshore oil and gas logistics. *Computers and Operations Research*, 2024
4. **A**. **Wang**, J. E. Arbogast, G. Bonnier, Z. Wilson, and C. E. Gounaris. Estimating the marginal cost to deliver to individual customers. *Optimization and Engineering*, 24:2409–2447, 2023a
5. **A**. **Wang**, A. Subramanyam, and C. E. Gounaris. Robust vehicle routing under uncertainty via branch-price-and-cut. *Optimization and Engineering*, 23:1895–1948, 2022a
6. **A**. **Wang**, N. Ferro, R. Majewski, and C. E. Gounaris. Mixed-integer linear optimization for full truckload pickup and delivery. *Optimization Letters*, 15(6):1847–1863, 2021
7. **A**. **Wang** and C. E. Gounaris. On tackling reverse convex constraints for non-overlapping of unequal circles. *Journal of Global Optimization*, 80(2):357–385, 2021
8. S. J. Bakker, **A**. **Wang**, and C. E. Gounaris. Vehicle routing with endogenous learning: Application to offshore plug and abandonment campaign planning. *European Journal of Operational Research*, 289(1):93–106, 2021
9. A. Subramanyam, **A**. **Wang**, and C. E. Gounaris. A scenario decomposition algorithm for strategic time window assignment vehicle routing problems. *Transportation Research Part B: Methodological*, 117:296–317, 2018b
10. **A**. **Wang**, C. L. Hanselman, and C. E. Gounaris. A customized branch-and-bound approach for irregular shape nesting. *Journal of Global Optimization*, 71(4):935–955, 2018b

CONFERENCE PROCEEDINGS

1. X. Gao, J. Xiong, **A**. **Wang**, Q. Duan, J. Xue, and Q. Shi. Ipm-lstm: A learning-based interior point method for solving nonlinear programs. *Under Review*, 2024
2. W. Liu, **A**. **Wang**, W. Yang, and Q. Shi. Mixed-integer linear optimization via learning-based two-layer large neighborhood search. *Under Review*, 2024
3. Q. Chen, T. Zhang, L. Yang, Q. Han, **A**. **Wang**, R. Sun, X. Luo, and T.-H. Chang. Symilo: A symmetry-aware learning framework for integer linear optimization. *Under Review*, 2024
4. J. Xiong, S. Lei, **A**. **Wang**, and X. Luo. An approximate-and-optimize method for security-constrained ac optimal power flow. *International Conference on Learning and Intelligent Optimization*, 2024

5. Y. Huang, Q. Zhong, **A**. **Wang**, S. Lei, and S. Lin. A q-learning-based multi-timescale resilience enhancement approach for power grids with high renewables. *International Conference on Power Science and Technology*, 2024
6. B. Li, L. Yang, Y. Chen, S. Wang, Q. Chen, H. Mao, Y. Ma, **A**. **Wang**, T. Ding, J. Tang, and R. Sun. Pdhg-unrolled learning-to-optimize method for large-scale linear programming. *International Conference on Machine Learning*, 2024
7. Q. Han, L. Yang, Q. Chen, X. Zhou, D. Zhang, **A**. **Wang**, R. Sun, and X. Luo. A gnn-guided predict-and-search framework for mixed-integer linear programming. *International Conference on Learning Representations*, 2023
8. M. Gasse, ..., **A**. **Wang**, et al. The machine learning for combinatorial optimization competition (ml4co): Results and insights. *Proceedings of the NeurIPS 2021 Competitions and Demonstrations Track*, PMLR 176:220–231, 2022

PRESENTATIONS

1. **A**. **Wang**. Solving large-scale optimization problems via learning-based algorithms. *9th Youth Symposium on Scientific and Engineering Computing*, 2023
2. L. Yang, Y. Wang, **A**. **Wang**, and X. Luo. A column genereation approach for telecommunications network optimization with port selection. *INFORMS Annual Meeting*, 2023
3. **A**. **Wang**, L. Wang, X. Zhou, D. Zhang, and X. Luo. A hierarchical decomposition approach for railway disruption recovery. *INFORMS Annual Meeting*, 2022b
4. A. Izadkhah, **A**. **Wang**, J. M. Lainez-Aguirre, J. M. Pinto, and C. E. Gounaris. Workload balancing in periodic distribution scheduling and routing optimization. *INFORMS Annual Meeting*, 2022
5. L. Yang, S. Lai, **A**. **Wang**, X. Luo, X. Zhou, H. Huang, S. Shao, Y. Zhu, and D. Zhang. Efficient primal heuristics for mixed-integer linear programs. *NeurIPS Annual Conference*, 2021
6. A. Izadkhah, **A**. **Wang**, J. M. Lainez-Aguirre, J. M. Pinto, and C. E. Gounaris. Periodic vehicle routing with trips spanning multiple days. *INFORMS Annual Meeting*, 2021
7. **A**. **Wang**, A. Subramanyam, and C. E. Gounaris. A branch-price-and-cut approach for robust vehicle routing. *INFORMS Annual Meeting*, 2020
8. **A**. **Wang**, X. Li, J. E. Arbogast, G. Bonnier, and C. E. Gounaris. A branch-and-cut algorithm for continuous-time inventory routing. *INFORMS Annual Meeting*, 2019d
9. **A**. **Wang**, J. E. Arbogast, G. Bonnier, Z. Wilson, and C. E. Gounaris. Estimation of marginal cost to serve individual customers. *INFORMS Annual Meeting*, 2019b
10. V. A. Silva, C. E. Gounaris, and **A**. **Wang**. Routing of platform supply vessels in offshore oil and gas logistics. *INFORMS Annual Meeting*, 2019 (Poster)
11. **A**. **Wang**, X. Li, J. E. Arbogast, G. Bonnier, and C. E. Gounaris. A branch-and-cut algorithm for continuous-time inventory routing. *AIChE Annual Meeting*, 2019c
12. **A**. **Wang**, J. E. Arbogast, G. Bonnier, Z. Wilson, and C. E. Gounaris. Estimation of marginal cost to serve individual customers. *AIChE Annual Meeting*, 2019a
13. **A**. **Wang** and C. E. Gounaris. A customized branch-and-bound approach for circle packing. *INFORMS Annual Meeting*, 2018b
14. **A**. **Wang**, C. L. Hanselman, and C. E. Gounaris. A novel branching scheme for problems with reverse convex quadratic constraints and its application to packing problems. *AIChE Annual Meeting*, 2018a
15. **A**. **Wang** and C. E. Gounaris. Solving robust vehicle routing via a branch-price-and-cut approach. *AIChE Annual Meeting*, 2018a
16. A. Subramanyam, **A**. **Wang**, and C. E. Gounaris. Strategic time window assignment in vehicle routing operations. *AIChE Annual Meeting*, 2018a

17. **A. Wang**, C. L. Hanselman, and C. E. Gounaris. Irregular shape nesting via branch-and-bound using custom relaxations. *INFORMS Annual Meeting*, 2017
18. **A. Wang** and C. E. Gounaris. A branch-price-and-cut approach for robust vehicle routing. *INFORMS Annual Meeting*, 2017

HONORS & AWARDS

Top 8 in Power Grid-Oriented Optimization Solver Competition （第一届能源电子产业创新大赛关键信息技术赛道电力用国产求解器技术比赛八强团队）, Industry Development and Promotion Center at Ministry of Industry and Information Technology, China *Dec. 2023*
2^{nd} place in the 2022 RAS Problem Solving Competition, INFORMS *Oct. 2022*
1^{st} place in ML4CO NeurIPS 2021 competition (Primal Task) *Nov. 2021*
Overseas High-Caliber Personnel (Level C), Human Resources and Social Security Administration of Shenzhen Municipality *Oct. 2021*
H. William and Ruth Hamilton Prengle Graduate Fellowship, CMU *Apr. 2018*
James C. Meade Graduate Fellowship, CMU *Dec. 2016*
Institutional Honor, TJU *Jun. 2015*
Shanghai Pudong Development Bank Endeavour Fellowship, TJU *Dec. 2014*
National Scholarship, TJU *Nov. 2013*
Shanghai Pudong Development Bank Scholarship, TJU *Dec. 2012*

PROFESSIONAL SERVICE

Journal reviewer: *Integer Programming and Combinatorial Optimization* (subreviewer), *European Journal of Operational Research*, *Transportation Research Part C*, *Networks*, *Optimization Letters*, *Optimization and Engineering*, *IEEE Transactions on Neural Networks and Learning Systems*, *INFORMS Journal on Computing*
Conference session chair: *INFORMS Annual Meeting 2018/2019*
Conference organizing committee: *YinzOR 2019*

TEACHING EXPERIENCE

Teaching Assistant, CMU *Jan. 2016 - May 2020*
- Optimization Modeling and Algorithms, Chemical Process Systems Design, Special Topics in Process Systems Engineering (CMU courses for undergraduate and graduate students)
- Models and Algorithms for Supply Chain Optimization (CAPD short course for industrial participants)