

# AKANG WANG

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## EDUCATION

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**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 Hoesve, 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

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**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 *Jul. 2024 - Present*

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

## RESEARCH EXPERIENCE

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**Center for Network Systems Optimization, SRIBD** *Jun. 2021 - Present*

Mixed-Integer Linear Programming

- 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*
- Participant, General Optimization Models, Theories, Algorithms and Applications for Complex Systems (复杂系统的通用优化模型、理论与算法及其应用), **National Key R&D Program of China** (国家重点研发计划) [Grant No. 2023YFA1009300] *Dec. 2023 - Nov. 2028*
- Participant, Mixed-Integer Linear Programming Solver Development, SRIBD *Oct. 2022 - Sept. 2024*
- Participant, Linear Programming Solver Development, SRIBD *Jun. 2021 - Sept. 2023*

Learning to Optimize

- Participant, Theory and Methods of Learning to Optimize and Its Applications to 5G Network (学习优化理论与方法及其在 5G 网络中的应用), **National Key R&D Program of China** (国家重点研发计划) [Grant No. 2022YFA1003900] *Dec. 2022 - Nov. 2027*
- Participant, Learning-Enhanced Optimization Algorithms for Large-Scale Mixed-Integer Linear Programs, Huawei *Sept. 2021 - Sept. 2022*
- PI**, 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, **National 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. **PI**, Train Timetabling for Urban Rail Transit Lines, CRRC Zhuzhou (中车株洲) *Oct. 2024 - Dec. 2025*
  2. **PI**, 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**

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1. A. Izadkhah, **A. Wang**, J. M. Lainez-Aguirre, J. M. Pinto, and C. E. Gounaris. The 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**

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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. *Advances in Neural Information Processing Systems*, 2024
2. 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. *Advances in Neural Information Processing Systems*, 2024b

3. 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
4. Y. Huang, Q. Zhong, **A. Wang**, S. Lin, C. Peng, and S. Lei. A q-learning-based multi-timescale resilience enhancement approach for power grids with high renewables. In *2024 IEEE 2nd International Conference on Power Science and Technology (ICPST)*, pages 1919–1924. IEEE, 2024
5. B. Li, L. Yang, Y. Chen, S. Wang, Q. Chen, H. Mao, Y. Ma, **A. Wang**, T. Ding, J. Tang, et al. Pdhg-unrolled learning-to-optimize method for large-scale linear programming. In *Forty-first International Conference on Machine Learning*, 2024
6. 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
7. 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

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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 generation 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

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- 3<sup>rd</sup> Prize 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三等奖), Industry Development and Promotion Center at Ministry of Industry and Information Technology, China Dec. 2023
- 2<sup>nd</sup> place in the 2022 RAS Problem Solving Competition, INFORMS Oct. 2022
- 1<sup>st</sup> 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

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**Journal reviewer:** *Integer Programming and Combinatorial Optimization, European Journal of Operational Research, Transportation Research Part C, Networks, Optimization Letters, Optimization and Engineering, INFORMS Journal on Computing, Mathematical Programming Computation, IEEE Transactions on Neural Networks and Learning Systems, IEEE Transactions on Power Systems, NeurIPS, ICLR*

**Conference session chair:** *INFORMS Annual Meeting 2018/2019*

**Conference organizing committee:** *YinzOR 2019*

## TEACHING EXPERIENCE

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- 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)