# AKANG WANG

LinkedIn: www.linkedin.com/in/wangakang
Website: http://akangw.github.io
Email: wangakang@sribd.cn

## 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 Associate *Jun. 2021 - Present*

**The Chinese University of Hong Kong, Shenzhen** Shenzhen, China
Adjunct Assistant Professor at School of Data Science *Jul. 2024 - Jun. 2027*

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

## RESEARCH EXPERIENCE

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

Discrete Optimization

1. **PI**, AI-Enhanced Decomposition Algorithms for Large-Scale Stochastic MIPs, **Shenzhen Science and Technology Program** （深圳市自然科学基金面上项目）[Grant No. JCYJ20250604191330040], RMB 300,000 *Oct. 2025 - Oct. 2028*
2. **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*
3. Participant, An Integrated Optimization Framework: Models, 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*
4. Participant, Mixed-Integer Linear Programming Solver Development, SRIBD *Oct. 2022 - Sept. 2024*
5. 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 (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*
2. Participant, Learning-Enhanced Optimization Algorithms for Large-Scale Mixed-Integer Linear Programs, Huawei *Sept. 2021 - Sept. 2022*

3. **PI**, Efficient Primal Heuristics for Mixed-Integer Linear Programs, NeurIPS 2021 ML4CO Competition *Jul. 2021 - Oct. 2021*

Power Systems 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*

Planning & Scheduling

1. Participant, Theoretical Studies on Efficient and Reliable Semantic Coding, Environment Reconstruction, and Resource Allocation in Smart Workshops（面向智慧车间高效可靠传输的语义编码、环境重构与资源配置理论研究）, **National Natural Science Foundation of China**（国家自然科学基金数学天元基金项目）[Grant No. 12426306] *Jan. 2025 - Dec. 2026*
2. **PI**, Train Timetabling for Urban Rail Transit Lines（城市轨道交通列车运行图自动编制算法）, CRRC Zhuzhou (中车株洲) *Oct. 2024 - Dec. 2025*
3. **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

1. J. Xiong, Y. Huang, Y. Wang, L. Yang, J. Wu, S. Lei, and **A**. **Wang**. Successive Fixing for Large-Scale SCUC Using First-Order Methods. *arXiv*, 2025b
2. W. Liu, **A**. **Wang**, and W. Yang. GPU-based Graver Basis Extraction for Nonlinear Integer Optimization. *arXiv*, 2025b
3. J. Xiong, L. Yang, Y. Wang, Y. Huang, J. Wu, S. Lei, and **A**. **Wang**. Relax-and-Cut for Temporal SCUC Decomposition. *arXiv*, 2025c
4. X. Gao, J. Xiong, L. Yang, **A**. **Wang**, W. Xu, and J. Xue. A Learning-Based Inexact ADMM for Solving Quadratic Programs. *arXiv*, 2025
5. A. Izadkhah, **A**. **Wang**, J. M. Lainez-Aguirre, J. M. Pinto, and C. E. Gounaris. The Periodic Vehicle Routing Problem with Multi-Day Trips. *Transportation Research Part E: Logistics and Transportation Review*, 2025
6. C. Wu, Q. Chen, **A**. **Wang***, T. Ding, R. Sun, W. Yang, and Q. Shi. On Representing Convex Quadratically Constrained Quadratic Programs via Graph Neural Networks. *Transactions on Machine Learning Research*, 2025
7. Y. Huang, S. Lei, J. Liu, C. Wang, T. Jiang, and **A**. **Wang**. A frequency-secured load pickup strategy for black-start restoration in ibr-rich distribution systems under dynamic microgrid formation. *Applied Energy*, 401:126752, 2025
8. J. Xiong, X. Gao, L. Yang, J. Xue, X. Luo, and **A**. **Wang***. Solving Quadratic Programs via Deep Unrolled Douglas-Rachford Splitting. *Transactions on Machine Learning Research*, 2025a. ISSN 2835-8856
9. **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. *Computers & Operations Research*, 174:106883, 2025

10. 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 & Operations Research*, 164: 106556, 2024
11. **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, 2023
12. **A**. **Wang**, A. Subramanyam, and C. E. Gounaris. Robust vehicle routing under uncertainty via branch-price-and-cut. *Optimization and Engineering*, 23:1895–1948, 2022
13. **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
14. **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
15. 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
16. 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, 2018
17. **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, 2018

## CONFERENCE PROCEEDINGS

1. W. Liu, **A**. **Wang**, D. Ma, H. Jiang, J. Wu, and W. Yang. Smoothing Binary Optimization: A Primal-Dual Perspective. *arXiv*, 2025a
2. Q. Chen, L. Yang, **A**. **Wang***, X. Luo, and Y. Zhang. QuadEnhancer: Leveraging Quadratic Transformations to Enhance Deep Neural Networks. In *Advances in Neural Information Processing Systems*, 2025b
3. Y. Qiu, Y. Xue, **A**. **Wang**, Y. Wang, Q. Shi, and Z.-Q. Luo. ROS: A GNN-based Relax-Optimize-and-Sample Framework for Max-k-Cut Problems. In *Proceedings of the 42nd International Conference on Machine Learning*, 2025
4. W. Liu, **A**. **Wang**, W. Yang, and Q. Shi. Mixed-Integer Linear Optimization via Learning-Based Two-Layer Large Neighborhood Search. In *International Conference on Learning and Intelligent Optimization*. Springer, 2025c
5. Q. Chen, L. Li, J. Wu, **A**. **Wang***, R. Sun, X. Luo, and Q. Shi. When GNNs meet symmetry in ILPs: an orbit-based feature augmentation approach. In *The Thirteenth International Conference on Learning Representations*, 2025a
6. 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. In *Advances in Neural Information Processing Systems*, volume 37, pages 122891–122916, 2024
7. 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. In *Advances in Neural Information Processing Systems*, volume 37, pages 24411–24434, 2024
8. J. Xiong, S. Lei, **A**. **Wang***, and X. Luo. An Approximate-and-Optimize Method for Security-Constrained AC Optimal Power Flow. In *International Conference on Learning and Intelligent Optimization*, pages 442–455. Springer, 2024
9. 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

10. 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. In *Proceedings of the 41st International Conference on Machine Learning*, 2024
11. 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
12. 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

## HONORS & AWARDS

Top Reviewer of 2024 NeurIPS (Top 10%) *Dec. 2024*
$3^{rd}$ 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*
$2^{nd}$ 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

**Reviewer:** *Integer Programming and Combinatorial Optimization*, *EJOR*, *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*, *ICML*, *NeurIPS*, *ICLR*, *AAAI*, *ECAI*, *Computational Optimization and Applications*
**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)