AKANG WANG

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EDUCATION

Carnegie Mellon University — Pittsburgh, USA
Doctor of Philosophy in Chemical Engineering (Process Systems Engineering) — *May 2020*
Thesis advisor: Chrysanthos E. Gounaris
GPA: 3.97/4.00

Tianjin University — Tianjin, China
Bachelor of Science in Chemical Engineering — *Jul. 2015*

Nankai University — Tianjin, China
Bachelor of Arts in Finance — *Jul. 2015*

WORK EXPERIENCE

Algorithm Engineer, DiDi Chuxing — *Aug. 2020 - Present*

RESEARCH EXPERIENCE

Ph.D. Research, Process Systems Engineering, Carnegie Mellon University — *Aug. 2015 - May 2020*

Supply Chain & Logistics Optimization

- Implemented tailored branch-price-and-cut algorithms to exactly solve several variants of vehicle routing problems (time windows, multiple trips, multiple depots, heterogeneous fleets, and multiple periods) and closed numerous previously open benchmark instances
- Presented a generic branch-price-and-cut approach for solving robust vehicle routing problems under demand and travel time uncertainty and demonstrated its versatility under various types of uncertainty sets
- Established a scenario-sampling framework to estimate the marginal cost of serving individual customers and delivered C++ codes to Air Liquide for commercial use
- Proposed a novel branch-and-cut algorithm for solving the continuous-time inventory routing problem that arises in the industrial gas business (e.g., Air Liquide) and obtained superior results over the state-of-the-art approach
- Built a compact mixed-integer linear programming model for the full truckload pickup and delivery problem and demonstrated its effectiveness and efficiency through extensive computational studies on industrial data from Braskem

Global Optimization

- Developed a customized branch-and-bound approach for irregular shape nesting and solved five-polygon nesting instances to global optimality for the firsts time in literature
- Incorporated strengthened intersection cuts to deal with reverse convex quadratic constraints and achieved superior computational performance over the state-of-the-art global solvers on solving circle-packing instances

SKILLS

Professional Expertise: Operations Research, Mathematical Optimization
Application Software: CPLEX, Gurobi, GAMS
Programming Languages: C++, Python, Julia
Languages: Mandarin (native), English (fluent)

PUBLICATIONS

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. *In Preparation*

A. **Wang**, X. Li, J. E. Arbogast, G. Bonnier, and C. E. Gounaris. A novel branch-and-cut algorithm for continuous-time inventory routing. *Ready for Submission*

A. **Wang**, A. Subramanyam, and C. E. Gounaris. Robust vehicle routing under uncertainty via branch-price-and-cut. *Optimization and Engineering (Under Review)*, 2021b

A. **Wang**, J. E. Arbogast, G. Bonnier, Z. Wilson, and C. E. Gounaris. Estimating the marginal cost to deliver to individual customers. *European Journal of Operational Research (Under Review)*, 2020a

A. **Wang**, N. Ferro, R. Majewski, and C. E. Gounaris. Mixed-integer linear optimization for full truckload pickup and delivery. *Optimization Letters (Accepted)*, 2021a

A. **Wang** and C. E. Gounaris. On tackling reverse convex constraints for non-overlapping of unequal circles. *Journal of Global Optimization*, pages 1–29, 2021

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

A. **Wang**, A. Subramanyam, and C. E. Gounaris. A branch-price-and-cut algorithm for robust vehicle routing under demand uncertainty. *Proceedings of the TSL Second Triennial Conference*, 2020c

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

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

PRESENTATIONS

A. **Wang**, A. Subramanyam, and C. E. Gounaris. A branch-price-and-cut approach for robust vehicle routing. *INFORMS Annual Meeting*, 2020b

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

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

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)

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

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

A. **Wang** and C. E. Gounaris. A customized branch-and-bound approach for circle packing. *INFORMS Annual Meeting*, 2018b

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

A. Wang and C. E. Gounaris. Solving robust vehicle routing via a branch-price-and-cut approach. *AIChE Annual Meeting*, 2018a

A. Subramanyam, **A. Wang**, and C. E. Gounaris. Strategic time window assignment in vehicle routing operations. *AIChE Annual Meeting*, 2018a

A. Wang, C. L. Hanselman, and C. E. Gounaris. Irregular shape nesting via branch-and-bound using custom relaxations. *INFORMS Annual Meeting*, 2017

A. Wang and C. E. Gounaris. A branch-price-and-cut approach for robust vehicle routing. *INFORMS Annual Meeting*, 2017b

A. Wang and C. E. Gounaris. A branch-price-and-cut approach for robust optimization in vehicle routing. *AIChE Annual Meeting*, 2017a

HONORS & AWARDS

H. William and Ruth Hamilton Prengle Graduate Fellowship, Carnegie Mellon University *Apr. 2018*
James C. Meade Graduate Fellowship, Carnegie Mellon University *Dec. 2016*
Institutional Honor, Tianjin University *Jun. 2015*
Shanghai Pudong Development Bank Endeavour Fellowship, Tianjin University *Dec. 2014*
National Scholarship, Tianjin University *Nov. 2013*
Shanghai Pudong Development Bank Scholarship, Tianjin University *Dec. 2012*

PROFESSIONAL SERVICE

Journal reviewer: *Integer Programming and Combinatorial Optimization 2019* (subreviewer), *Optimization Letters*, *Optimization and Engineering*
Conference session chair: *INFORMS Annual Meeting 2018/2019*
Conference organizing committee: *YinzOR 2019*

TEACHING EXPERIENCE

Teaching Assistant, Carnegie Mellon University *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)