# AKANG WANG

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## EDUCATION

**Carnegie Mellon University** — Pittsburgh, PA
Doctor of Philosophy in Chemical Engineering — *May 2020*
Thesis advisor: Chrysanthos E. Gounaris
GPA: 3.96/4.00

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

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

## RESEARCH EXPERIENCE

Ph.D. Research, Process Systems Engineering, Carnegie Mellon University — *Sept. 2015 - Present*

**Supply Chain 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, CBC
**Programming Languages:** C++, Python
**Languages:** Mandarin (native), English (fluent)

## PUBLICATIONS

**A. Wang**, A. Subramanyam, and C. E. Gounaris. A branch-price-and-cut algorithm for robust vehicle routing under uncertainty. *In Preparation*, 2020c

**A. Wang**, X. Li, J. E. Arbogast, G. Bonnier, and C. E. Gounaris. A novel branch-and-cut algorithm for continuous-time inventory routing. *In Preparation*, 2020b

**A. Wang**, J. E. Arbogast, G. Bonnier, Z. Wilson, and C. E. Gounaris. Estimation of marginal cost to serve individual customers. *Under Review*, 2020a

**A. Wang** and C. E. Gounaris. On tackling reverse convex constraints for non-overlapping of circles. *Under Review*, 2019

S. Bakker, **A. Wang**, and C. E. Gounaris. Vehicle routing with endogenous learning: Application to offshore plug and abandonment campaign planning. *Under Review*, 2019

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

**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**, X. Li, J. E. Arbogast, G. Bonnier, and C. E. Gounaris. A branch-and-cut algorithm for continuous-time inventory routing. *INFORMS Annual Meeting*, 2019b

**A. Wang**, J. E. Arbogast, G. Bonnier, Z. Wilson, and C. E. Gounaris. Estimation of marginal cost to serve individual customers. *INFORMS Annual Meeting*, 2019a

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

**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**, 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*, 2017

## 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 *Jul. 2015*
National Scholarship, Tianjin University *Dec. 2013*

## PROFESSIONAL SERVICE

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

## TEACHING EXPERIENCE

Teaching Assistant, Carnegie Mellon University *Jan. 2016 - May 2019*

- 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)