

# AKANG WANG

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## EDUCATION

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### Carnegie Mellon University

Doctor of Philosophy in Chemical Engineering

Thesis advisor: [Chrysanthos E. Gounaris](#)

GPA: 3.95/4.00

Pittsburgh, PA

May 2020

### Tianjin University

Bachelor of Science in Chemical Engineering

Tianjin, China

Jul. 2015

### Nankai University

Bachelor of Arts in Finance

Tianjin, China

Jul. 2015

## RESEARCH EXPERIENCE

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Ph.D. Research, [Process Systems Engineering](#), Carnegie Mellon University  
**Supply Chain Optimization**

Sept. 2015 - Present

- Implemented tailored branch-price-and-cut algorithms to exactly solve several variants of vehicle routing problems (time windows, multiple trips, heterogeneous fleets, multiple periods, uncertain demands) and closed numerous previously open benchmark instances
- 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 novel 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 first 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

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**Professional Expertise:** Operations Research, Mathematical Optimization, Process Optimization

**Application Software:** CPLEX, Gurobi, GAMS, CBC

**Programming Languages:** C++, Python, OpenMP

**Languages:** Mandarin (native), English (fluent)

## PUBLICATIONS

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**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*, 2019d

- A. Wang**, J. E. Arbogast, G. Bonnier, Z. Wilson, and C. E. Gounaris. Estimation of marginal cost to serve individual customers. *In Preparation*, 2019b
- A. Wang** and C. E. Gounaris. On tackling circle-circle non-overlapping constraints. *In Preparation*, 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
- S. Shi, L. Wang, **A. Wang**, R. Huang, L. Ding, R. Su, W. Qi, and Z. He. Bioinspired fabrication of optical fiber spr sensors for immunoassays using polydopamine-accelerated electroless plating. *Journal of Materials Chemistry C*, 4(32):7554–7562, 2016

## PRESENTATIONS

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- 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*, 2019c
- 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

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| H. William and Ruth Hamilton Prengle Graduate Fellowship, Carnegie Mellon University | <u>Apr. 2018</u> |
| James C. Meade Graduate Fellowship, Carnegie Mellon University                       | <u>Dec. 2016</u> |
| Institutional Honor, Tianjin University  | <u>Jul. 2015</u> |
| National Scholarship, Tianjin University   | <u>Dec. 2013</u> |

## PROFESSIONAL SERVICE

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- 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

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- 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)