

# AKANG WANG

## GENERAL INFORMATION

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Nationality: People's Republic of China

Languages: Mandarin (native), English (fluent)

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## EDUCATION

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Ph.D., [Chemical Engineering, Carnegie Mellon University](#), Pittsburgh, USA *Aug. 2015 - May 2020*

- Thesis title: “Optimization Algorithms for Vehicle Routing under Uncertainty and Packing Problems”
- Thesis advisor: [Chrysanthos E. Gounaris](#)
- GPA: 3.95/4.00

B.S., Chemical Engineering, Tianjin University, Tianjin, China

*Sept. 2011 - Jul. 2015*

- Thesis title: “The Bioinspired Fabrication, Modification and Application of Fiber-Optical SRP Sensors”
- Thesis advisor: Rongxin Su
- GPA: 3.85/4.00

B.A., Finance, Nankai University, Tianjin, China

*Mar. 2013 - Jul. 2015*

- Thesis title: “The Study on Diversification of China's Foreign Exchange Reserve”
- Thesis advisor: Fenglong Gao

## RESEARCH EXPERIENCE

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Ph.D. Research, [Process Systems Engineering, Carnegie Mellon University](#) *Sept. 2015 - May 2020*  
**Supply Chain Optimization**

- Developed branch-price-and-cut codes to solve various types of vehicle routing problems (time windows, multi-trip, heterogeneous fleets, multi-period, release dates, uncertain demands)
- Proposed a scenario-sampling framework to estimate the marginal cost of serving individual customers (delivered codes to [Air Liquide](#))
- Proposed a novel branch-and-cut approach for solving continuous-time inventory routing problems and obtained superior results over the state-of-the-art approach (collaboration with [Air Liquide](#))
- Developed a novel mixed-integer linear programming model for full truckload delivery planning (collaboration with [Braskem](#))

### Global Optimization

- Developed a customized branch-and-bound approach for irregular shape nesting problems and solved five-polygon nesting instances to global optimality for the first time in the 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

## PUBLICATIONS

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- A. Wang, X. Li, and C. E. Gounaris. A novel branch-and-cut approach for continuous-time inventory routing problems. *In Preparation*, 2019b
- A. Wang, J. E. Arbogast, G. Bonnier, and C. E. Gounaris. Estimation of marginal cost to serve individual customers. *In Preparation*, 2019a
- A. Wang and C. E. Gounaris. On tackling circle-circle non-overlapping constraints. *In Preparation*, 2019b
- 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 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> |
| Shanghai Pudong Development Bank Endeavour Fellowship, Tianjin University            | <u>Dec. 2014</u> |
| National Scholarship, Tianjin University   | <u>Dec. 2013</u> |
| Shanghai Pudong Development Bank Scholarship, Tianjin University                     | <u>Dec. 2012</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*

## SKILLS

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Mathematical Optimization, Operations Research, Process Optimization, CPLEX, Gurobi, CBC, GAMS, C++, Python, OpenMP

## 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)