

# Akang Wang

## General Information

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Nationality: People's Republic of China

Languages: Mandarin (native), English (fluent)

Email: [akangw@andrew.cmu.edu](mailto:akangw@andrew.cmu.edu)

Cell: (+1) 412-330-0615

Address: DH 1207, Carnegie Mellon University, Pittsburgh PA 15213, USA

Website: <https://akangw.github.io/>

## Education

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Ph.D., Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA *Sept. 2015 - present*

- Thesis Title: “Optimization Algorithms for Vehicle Routing under Uncertainty and Packing Problems”
- Thesis Advisor: Chrysanthos E. Gounaris
- GPA: 3.94/4.00

B.S., Chemical Engineering, Tianjin University, Tianjin, China *Sept. 2011- Jul. 2015*

- Thesis Title: “The Bioinspired Fabrication, Modification and Application of Fiber-Optical SPR 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, Carnegie Mellon University, Chrysanthos E. Gounaris *Sept. 2015 – present*

A Customized Branch-and-Bound Approach for Irregular Shape Nesting

- Developed a novel branching scheme to deal with reverse convex quadratic constraints
- Utilized feasibility-based and optimality-based model tightening techniques
- Solved five-polygon nesting problems to global optimality for the first time in literature

On Tackling Circle-Circle Non-overlapping Constraints

- Employed a branching strategy on circle-circle non-overlapping constraints
- Incorporated strengthened intersection cuts and feasibility-based tightening
- Achieved superior computational performance over state-of-the-art global solvers

A Branch-Price-and-Cut Approach for Robust Vehicle Routing

- Developed sophisticated Branch-Price-and-Cut codes for Vehicle Routing Problems
- Proposed to add robust rounded capacity inequalities to guarantee robust feasibility
- Obtained comparable results with the Branch-and-Cut approach

Estimation of Marginal Cost to Serve Individual Customers

- Developed Branch-Price-and-Cut codes for Multi-trip Vehicle Routing Problems
- Proposed a framework to quantify the marginal cost of serving a new customer

## 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, Ministry of Education of the People's Republic of China	<u>Dec. 2013</u>
Shanghai Pudong Development Bank Scholarship, Tianjin University	<u>Dec. 2012</u>

## Publications

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- Wang, A.**, Gounaris, C.E., 2019. On Tackling Circle-Circle Non-overlapping Constraints. *In Preparation*.
- Subramanyam, A., **Wang, A.**, Gounaris, C.E., 2018. A Scenario Decomposition Algorithm for Strategic Time Window Assignment Vehicle Routing Problems. *Transportation Research Part B: Methodological*, 117, pp296-317.
- Wang, A.**, Hanselman, C.L. and Gounaris, C.E., 2018. A Customized Branch-and-Bound Approach for Irregular Shape Nesting. *Journal of Global Optimization*, pp.1-21.
- Shi, S., Wang, L., **Wang, A.**, Huang, R., Ding, L., Su, R., Qi, W. and He, Z., 2016. Bioinspired fabrication of optical fiber SPR sensors for immunoassays using polydopamine-accelerated electroless plating. *Journal of Materials Chemistry C*, 4(32), pp.7554-7562.

## Presentations

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- Wang, A.**, Gounaris, C.E., "A Customized Branch-and-Bound Approach for Circle Packing," INFORMS 2018 Annual Meeting, Nov. 7, 2018.
- Wang, A.**, Hanselman, C.L., Gounaris, C.E., "Irregular Shape Nesting via Branch-and-Bound Using Custom Relaxations," INFORMS 2017 Annual Meeting, Oct. 25, 2017.
- Wang, A.**, Gounaris, C.E., "A Branch-Price-and-Cut Approach for Robust Vehicle Routing", INFORMS 2017 Annual Meeting, Oct. 24, 2017.
- Wang, A.**, Gounaris, C.E., "Branch-Price-and-Cut for Distribution via Heterogeneous Fleets," Enterprise-Wide Optimization Meeting, Sept. 20, 2016. Poster.

## Teaching Experience

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- Teaching Assistant, Carnegie Mellon University Jan. 2016 – May. 2018
- *Optimization Modeling and Algorithms*: helped undergraduate students understand basic concepts and theories in optimization
  - *Chemical Process Systems Design*: managed 5 groups of senior-year students and gave guidance for projects
  - *Special Topics in Process Systems Engineering*: assisted graduate students in course projects related to meta-heuristics and mathematical modeling
  - *Models and Algorithms for Supply Chain Optimization (CAPD short course)*: prepared programming exercises and answered modeling questions about supply chain logistics

## Skills

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Mathematical Optimization, Operations Research, Machine Learning, CPLEX, GAMS, C++, Python

## Journal Reviewer

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*Optimization Letters, Optimization and Engineering, Integer Programming and Combinatorial Optimization 2019* (subreviewer)