Akang Wang

General Information

Nationality: People's Republic of China

Languages: Mandarin (native), English (fluent)

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Education

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: 3.95/4.00

B.S., Chemical Engineering, Tianjin University, Tianjin, China   *Sept. 2011- Jul. 2015*
- Thesis Title: "The Bioinspired Fabrication, Modification and Application of Fiber-Optical 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

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 Vehicle Routing Problems with intermediate replenishment facilities

– Proposed a framework to quantify the marginal cost of serving a new customer

A Branch-and-Cut Algorithm for Continuous-time Inventory Routing Problems
- – Developed Branch-and-Cut approach for solving Continuous-time Inventory Routing Problems
- – Proposed to add various types of valid inequalities to expedite the solution process
- – Obtained comparable results with the state-of-the-art approach

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*
Shanghai Pudong Development Bank Endeavour Fellowship, Tianjin University	*Dec. 2014*
National Scholarship, Ministry of Education of the People's Republic of China	*Dec. 2013*
Shanghai Pudong Development Bank Scholarship, Tianjin University	*Dec. 2012*

Publications

Wang, A., Arobgast, J.E., Bonnier, G., Gounaris, C.E., 2019. Estimation of Marginal cost to Serve Individual Customers. *In Preparation.*

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

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., "A Novel Branching Scheme for Problems with Reverse Convex Quadratic Consraints and Its Application to Packing Problems," AIChE Annual Meeting, Oct. 30, 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.

Teaching Experience

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

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

Journal Reviewer

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