Curriculum Vitae

Hyungjoo Cha, Ph.D. Candidate

CONTACT INFORMATION

Ph.D. Candidate
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RESEARCH INTEREST

My research interests lie in the diverse applications of combinatorial optimization algorithms within supply chain networks. Specifically, I focus on sequential decision-making problems, but not limited to routing systems and production scheduling. To address these challenges, I adopt a flexible approach, striving to design and explore innovative algorithms that build upon traditional combinatorial optimization methods, including mathematical modeling and heuristic algorithms, while leveraging data-driven techniques and scalable optimization strategies.

EDUCATION

Korea University Sep. 2020 -
Seoul, Korea
Integerated MS & Ph.D., Industrial Management Engineering
(GPA: 4.35/4.50)

Hankuk University of Foreign Studies Mar. 2014 - Aug. 2020
Yong-in, Korea
B.E., Industrial Management Engineering (GPA: 4.16 / 4.50)
B.BA., International Finance (Double Major)

PUBLICATIONS

Peer-reviewed publications

1. Kim, H., **Cha, H.**† and Cheong, T.†. (2024).“Analyzing Economic Effect on mRNA Vaccine Inventory Management with Redistribution Policy”. *Scientific Reports, 14, 20425 (2024), https://doi.org/10.1038/s41598-024-71322-5*
2. **Cha, H.**, Lee, C., Xie, C., Lu, Q - C., Eun, J. and Cheong,. T.†. (2024). “An Exact A*-based Tree Search Algorithm for TSP with Load-Dependent Risk Measure”. *IEEE Transactions on Intelligent Transportation Systems, vol. 25, no. 9, pp. 10817-10834, Sept. 2024, doi: 10.1109/TITS.2024.3384576.*
3. Kim, C.K., Lee, C., Kim, D.K., **Cha, H.**† and Cheong, T † (2023). “Enhancing Supply Chain Efficiency: A Two-Stage Model for Evaluating Multiple Sourcing and Extra Procurement Strategy Optimization”. *Sustainability 15, no. 22: 16122. https://doi.org/10.3390/su152216122*
4. Kim, D.K., **Cha, H.**, and Cheong,. T.†. (2022). “Selective Two-echelon Orienteering Problem in urban logistics using UAM and Drones”. *Journal of Logistics Science & Technology.*
5. **Cha, H.**, Kim, D.K., Eun, J., and Cheong, T.† (2022). “Collaborative Traveling Salesman Problem with Ground Vehicle as a Charger for Unmanned Aerial Vehicle”. *Transportation Letters: International Journal of Transportation Research, Vol. 15(7), pp.707-721; doi:10.1080/19427867.2022.2082006.*

6. **Cha, H.**, Kim, D.K., Song, B. and Lee, C. † (2022). "A Heuristic algorithm for Vehicle Routing Problem with Electric Micro-mobility Delegations". *Journal of the Korean Institute of Industrial Engineers.* 48(1), 35-51
7. **Cha, H.**, Kim, D.K., Eun, J., and Cheong, T.† (2021). "A green flying sidekick traveling salesman problem with drone recharge". *Journal of Logistics Science & Technology*

Working papers (†: corresponding author)

1. Chung, S., **Cha, H.**,† and Cheong, T†. (2025+). "An optimization model and algorithm for job scheduling with extra resource allocation in shipbuilding". *Under 2nd review in International Journal of Production Research.*
2. **Cha, H.**, Park, J., Lee, C.† and Cheong, T†. (2025+). "An Exact Algorithm for Vehicle Routing Problem with Availability Profiles". *To be further determined.*
3. **Cha, H.**, Huh, W - T.† and Cheong, T†. (2025+). "A Feeder-van and Truck Routing Problem for the Urban Waste Collection". *To be further determined.*
4. Lee, J., **Cha, H.**,† and Cheong, T†. (2025+)."A three dimensional pipe routing problem for semiconductor fabraction plant". *To be further determined.*
5. **Cha, H.**, Park, Y†. (2024+)."Spatially Constrained Multiseries Clusterwise Regression". *To be further determined.*
6. Kang, S., **Cha, H.**, Xie, C., Song, S. and Cheong, T†. (2024+)."EV recuperation TSP". *To be further determined.*
7. Kang, S., Han, K., **Cha, H.**, Song, G., Lee, S., Kim, S. and Cheong, T†. (2023+). "Physician Scheduling Problem to Maximize Emergency Department Utilization". *To be further determined.*
8. Park, J., **Cha, H.**, and Cheong, T†. (2024+)."Ambulance routing problem". *To be further determined.*
9. Choi, M., **Cha, H.**,† and Cheong, T†. (2024+)."Multi-Period Multi-Depot Vehicle Routing Problem for Mobile Center-based Last Mile Delivery". *To be further determined.*
10. Kwon, S., **Cha, H.**,† and Cheong, T†. (2024+)."Underground logistics optimization considering mid-hub allocations". *To be further determined.*
11. Kim, D.K., **Cha, H.,** and Cheong, T†. (2024+)."Routing optimization using UAM". *To be further determined.*
12. Kim, H., **Cha, H.,** and Cheong, T†. (2024+)."Optimizations in power grid systems". *To be further determined.*

SELECTED PROJECT

Industry projects

1. Large-scale job-shop factory planning optimization for display panel production
   Samsung Display, May. 2023 -
   - Developing an optimization framework for large-scale, long time horizon factory planning schedule under job shop configuration for display panel production company
2. Residual inventory parts combination optimization problem
   Samsung Electronics, Jan. 2023 - Jun. 2023
   - Developed an optimized and systemic approach to find the best possible combination of product parts using the leftover resources, with regard to user preferences.

3. Warehouse evaluation system considering factory line relocation
   Hyundai Unitus, Jun. 2022 - Dec. 2022
   - Developed an auto-assessment tool for the 3rd-party warehouse box-arrangement.
4. Production schedule optimization in chemical industry
   LG Chemical, Oct. 2021 - May. 2022
   - Developed optimization model suitable for polymer production schedule

Government grant projects

1. LINC 3.0 Problem-based Learning Project
   City of Vancouver, Canada Post, University of British Columbia, Korea University, Jan. 2023, August 2023
   - Proposed a system to enhance the current bidding system for City of Vancouver, logistic system for freight consolidation and processing for Canada Post.
2. Quantum Machine Learning Simulator
   PI : Prof. In-Chan Choi , National Research Foundation of Korea(NRF), Jul. 2020 - Dec. 2021
   - Research oriented project for developing a quantum simulator on classical computers and quantum-based algorithms for various optimization problems.
3. Development of automatic inspection and quality prediction service for the automobile parts industry using machine vision intelligent platform
   Korea Industrial Complex Corporation (KICOX), Oct. 2020 – Sep. 2021
   - Deep learning model for on-time automatic quality inspection and predictive quality control using the model-based prediction
4. Distant-Domain Transfer Learning for Human Daily Behavior Analysis Framework
   National Research Foundation of Korea(NRF), Dec. 2018 – Feb. 2020
   - Developed a data acquisition system to detect the hand movement occured during the assembly process in manufacture industry

Etc.

TEACHING EXPERIENCE

Teaching Interest: Combinatorial optimizations, Supply Chain optimization, Approximations, Algorithms and Artificial Intelligence for industrial problems

Instructor (at Hansung University)

- GEN0961: Introduction to Linear Algebra (Spring 2024, 2025)
  (Lecture evaluation: 4.26 / 5.00)
- V030037: Introduction to Artificial Intelligence (Fall 2024)
  (Lecture evaluation: 4.38 / 5.00)

Teaching Assistant (at Korea University)

- IMEN223: Introduction to Management Science (Spring 2020 – 2022)
- IMEN302: Supply Chain Management (Fall 2021 – 2023)

AWARD, PATENTS & SCHOLARSHIPS

Awards

- Best researcher award, Korea University - Feb. 2024
- Second prize, Best paper award, 10th Logistics Paper Award, Foundation of Korea Logistics Industry Promotion - Nov. 2023
- Third prize, Best paper award, 18th Master Thesis Competition, Korea Institute of Industrial Engineers - Nov. 2022
- Second prize, Best paper award, The Korean Society of Supply Chain Management - Apr. 2022
- First prize, Best paper award, The Society of Logistic Science & Technology - Nov. 2021
- Second Runner's Up at Logistic Idea Contests, Korea Logistics Industry Promotions (KLIP) - Nov. 2018

Patents

- Chungmok Lee, **Hyungjoo Cha**, DongKyun Kim, Bokyeong Song. A hierarchical route recommendation method and system considering inter-node accessibility using multimodes, 2022. KR102459756B1.

Scholarships

- Brain Korea 21 scholarhip, Ministry of Education (Stipend) - 2020 - 2025
- Graduate student scholarhip, Korea University (Partial tuition) - Fall 2021 & 2022
- Honors scholorship, HUFS (merit-based) - Spring & Fall 2015
- Matthew.D.Lee Fellowship (merit-based, 1 year full tuition) - Spring & Fall 2019
- HUFS Employers Fellowship (Stipend) - Fall 2019
- Best Honors scholarship (merit-based) - Fall 2019

PRESENTATIONS *Conference presentations*

1. Analyzing a capacitated vehicle routing problem variant: Insights from approximations and mathematical analytics
   - INFORMS Annual Meeting 2024, Seattle, Washington, USA, 2024.
2. Optimizing workspace scheduling for shipyard manufacturing under additional resource input consideration
   - 33rd European Conference on Operational Research (EURO), Copenhagen, Denmark, 2024
3. Optimizing Shipyard Production Timelines through Extra Resource Input Allocation: Model and Algorithm
   - International Workshop on Production and Logistics (IWPL), Yokohama, Japan, 2024
4. Efficient Routing and Cargo Transfer Strategies with Heuristic Algorithm in Two-Truck Vehicle Routing Problem
   - INFORMS Annual Meeting 2023, Phoenix, Arizona, USA, 2023
5. Divide-and-Conquer: Two-truck Vehicle Routing Problem with Unidirectional Cargo Transfer for the Waste Collection

- Edition PROLOG, Luxembourg, 2023

6. An Optimal Tree Search Algorithm For TSP With History-and-Payload Based Risk Measure
   - INFORMS Annual Meeting 2022, Indianapolis, IN, USA, 2023
7. Practical EV and E-drone routing problem: Recharging E-drone battery using EV
   - KIIE 2022 Spring, Jeju, Korea, 2022
8. Ground vehicle and unmanned aerial vehicle cooperative delivery with mothership charging
   - INFORMS 2021, Anaheim, CA, USA, 2021
9. A sequence-dependent traveling salesman problem in outbound logistics
   - IFORS 2021, Virtual, 2021
10. Delegated vehicle routing problem with micro-mobility in urban last-mile logistics
    - KIIE 2021 Spring, Jeju, Korea, 2021
11. Load-reliant traveling salesman problem for HAZMAT delivery
    - KIIE 2021 Spring, Jeju, Korea, 2021
12. Process Discovery on Assembly Process using Multimodal Human Activity Recognitions
    - KIIE 2019 Fall, Seoul, Korea, 2019

SERVICE, VOLUNTEERING & ACTIVITIES

Academic Service

- Ad-hoc reviewer for *Alexandria Engineering Journal*