

# Changhun Lee

PH.D. · POST-DOCTORAL RESEARCHER · UNIST AIGS

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## Education

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### PH.D. INDUSTRIAL ENGINEERING

2016.03 - 2023.02

- Institution: Ulsan National Institute of Science and Technology (UNIST)
- Advisor: Dr. Chiehyeon Lim
- Dissertation Title:  
"Tackling Three Problems in Controlled Sequence Generations: Bridging Reinforcement Learning with Language Models"

### BSc. ECONOMICS

2011.03 - 2015.02

- Institution: Ajou University

## Competency

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### TECHNICAL & RESEARCH CAPABILITIES

- Proficient in Python, R, TensorFlow, and Keras, intermediate in PyTorch and Spark
- Expertise in sequential decision-making models (i.e., language modeling, reinforcement learning, etc.)
- Adept at translating real-world problems described in everyday language into general, abstract, and mathematical logic.

### COMMUNICATION SKILLS

- Advanced level of English writing
- Advanced level of English speaking

## Professional Experience

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2023.03-

Present

**Postdoctoral Researcher**, Graduate School of Artificial Intelligence, UNIST

2019-2022

**Principal Investigator**, Granted Research Program, Daewoong Pharmaceuticals Foundation

2021.11-

2021.12

**Research Advisor**, Project-based Learning Program, LG Electronics

2018-2019

**Co-founder**, Data Team, Smart Ship Venture Tech

2017.07-

2017.12

**Data Analyst**, Business Planning Department, Hyundai Mipo Dockyard

2016-2017

**Graduate Teaching Assistant**, Department of Industrial Engineering, UNIST

## Awards, Scholarships, & Grants

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2023

**National Academic Research Grant**, National Research Foundation of Korea  
**UNIST Best Research Award**, Ulsan National Institute of Science and Technology

2022

**Prominent Presentation Award**, The Korean Nutrition Society  
**Best Oral Presentation Award**, Korean Academy of Pediatric Allergy and Respiratory Disease

2020

**Best Poster Presentation Award**, The Korean Nutrition Society

2018

**Minister of Science and ICT Award**, Korea Institute of Science and Technology  
**Daewoong Foundation Research Scholarship**, Daewoong Pharmaceuticals Foundations

2013

**Student Best Paper Award**, Korean Association for Policy Sciences

## Publications

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## CONFERENCE PAPERS

**Changhun Lee.**, Chiehyeon Lim. (2024). “Reward Dropout: Pareto Improvement in Reinforced Language Models,” *arXiv preprint arXiv:2310.04483*

Jongkyung Shin.\*, **Changhun Lee.\***, Chiehyeon Lim., Yunmo Shin., Junseok Lim. (2022). “Recommendation in Offline Stores: A Gamification Approach for Learning the Spatiotemporal Representation of Indoor Shopping,” *In Proceedings of the 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (pp. 3878-3888).

**Changhun Lee.**, Soohyeok Kim., Sehwa Jeong., Chiehyeon Lim., Jayun Kim., Yeji Kim., Minyoung Jung. (2021). “MIND dataset for diet planning and dietary healthcare with machine learning: Dataset creation using combinatorial optimization and controllable generation with domain experts,” *In Thirty-fifth Conference on Neural Information Processing Systems (NeurIPS) Datasets and Benchmarks Track (Round 2)*.

**Changhun Lee.**, Soohyeok Kim., Chiehyeon Lim., Jayun Kim., Yeji Kim., Minyoung Jung.. (2021). “Diet Planning with Machine Learning: Teacher-forced REINFORCE for Composition Compliance with Nutrition Enhancement,” *In Proceedings of the 27th ACM SIGKDD Conference on Knowledge Discovery & Data Mining* (pp. 3150-3160).

## JOURNAL PAPERS

**Changhun Lee.**, Soohyeok Kim., Sehwa Jeong., Jayun Kim., Yeji Kim., Chiehyeon Lim., Minyoung Jung. (2023). “Artificial intelligence generates allergy-free high-nutrition diets: A first study on the real-world solution development and its evaluation,” *To be submitted to Allergy*.

**Changhun Lee.**, Soohyeok Kim., Jayun Kim., Chiehyeon Lim., Minyoung Jung. (2022). “Challenges of diet planning for children using artificial intelligence,” *Nutrition Research and Practice*, 16(6), 801-812.

**Changhun Lee.**, Chiehyeon Lim. (2021). “From technological development to social advance: A review of Industry 4.0 through machine learning,” *Technological Forecasting and Social Change*, 167, 120653.

Min Jung., Chiehyeon Lim., **Changhun Lee.**, Soohyeok Kim., Jayun Kim. (2020). “Human dietitians vs. Artificial intelligence: Which diet design do you prefer for your children?,” *Journal of Allergy and Clinical Immunology*, 147(2), AB117.

## Presentations

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\* *presenting author*; + *mentored undergraduate*

## CONTRIBUTED PRESENTATIONS

**Changhun, Lee.** “Tutorial on Controlled Sequence Generation: From the Language Model Perspectives.” *Tutorial Session: Korean Institute of Industrial Engineers, Ulsan, Korea*

Sehwa Jeong.<sup>+</sup>, Soohyeok Kim., **Changhun, Lee.**, Jayun Kim., Yeji Kim., Chiehyeon Lim., Minyoung Jung.\* 2022. Toward the Diet Planning with Artificial Intelligence for Children with Food Allergies. *Flash Talk Session: EAACI Hybrid Congress 2022, Prague, Czech Republic*

**Changhun, Lee.\***, Soohyeok Kim., Sehwa Jeong.<sup>+</sup>, Chiehyeon Lim., Jayun Kim., Yeji Kim., Minyoung Jung. 2021. MIND dataset for diet planning and dietary healthcare with machine learning: Dataset creation using combinatorial optimization and controllable generation with domain experts. *Best Paper Sessions: Korean Artificial Intelligence Association 2021, Virtual*

**Changhun, Lee.**, Soohyeok Kim., Jayun Kim., Chiehyeon Lim., Minyoung Jung.\* 2021. Human- or Artificial Intelligence-designed Diets: Which Do You Prefer for Your Children? *Poster Presentation: AAAAI 2021, Virtual*

## Experience in Academic & Industrial Research Projects

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DEVELOPMENT OF A CONTROLLED SEQUENCE GENERATION MODEL SOLVING THE OBJECTIVES

2023 - present

MISMATCH PROBLEM OF DATA-DRIVEN SEQUENCE OPTIMIZATION

- Funding Agency: National Research Foundation of Korea

DEVELOP AND VALIDATE A LEARNING FRAMEWORK FOR INTERACTION AND CO-EVOLUTION BETWEEN HUMANS AND AI

2021 - present

- Funding Agency: Ministry of Education

<b>DEVELOPING INTELLIGENT BIO-OMICS ANALYSIS TECHNOLOGY</b> <ul style="list-style-type: none"> <li>• Funding Agency: Ministry of SMEs and Startups</li> </ul>	<i>2021 - 2023</i>
<b>DEVELOP A METHODOLOGY FOR IDENTIFYING LATENT FACTORS EXPLAINING VARIABILITY IN SOCIAL SCIENCE BIG DATA</b> <ul style="list-style-type: none"> <li>• Funding Agency: Ministry of Education</li> </ul>	<i>2020 - 2022</i>
<b>DEVELOPMENT OF A NON-FACE-TO-FACE PRECISION DIETARY AI SERVICE SYSTEM TAILORED TO THE GUT FLORA OF PEDIATRIC ATOPIC DISEASES</b> <ul style="list-style-type: none"> <li>• Funding Agency: Ministry of Science and ICT</li> </ul>	<i>2020-2021</i>
<b>DEVELOPMENT OF A DATA REORGANIZATION AND RECOMMENDATION SYSTEM TO REDUCE THE COST OF DRUG DISCOVERY</b> <ul style="list-style-type: none"> <li>• Funding Agency: Daewoong Pharmaceuticals Foundation</li> </ul>	<i>2019 - 2022</i>
<b>STRUCTURAL ANALYSIS OF THE PROCESS OF TECHNOLOGICAL INNOVATION IN THE FOURTH INDUSTRIAL REVOLUTION</b> <ul style="list-style-type: none"> <li>• Funding Agency: Ministry of Education</li> </ul>	<i>2018 - 2021</i>
<b>RESEARCH ON SERVITIZATION IN INDUSTRY 4.0 THROUGH REGIONAL INDUSTRIAL-ACADEMIC COOPERATION</b> <ul style="list-style-type: none"> <li>• Funding Agency: Ministry of Science and ICT</li> </ul>	<i>2018-2019</i>
<b>UNDERSTAND THE KEY RESEARCH AND APPLICATION INDUSTRIES OF THE FOURTH INDUSTRIAL REVOLUTION</b> <ul style="list-style-type: none"> <li>• Funding Agency: Ulsan National Institute of Science and Technology</li> </ul>	<i>2017-2020</i>