

# Changhun Lee

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

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## Education

PH.D. INDUSTRIAL ENGINEERING

2016.03 - 2023.02

- 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

## Professional Experience

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, Fellowships, & Grants

2023

**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 Research Scholarship Grant**, Daewoong Pharmaceuticals Foundations

2013

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

## Publications

### CONFERENCE PAPERS

**Changhun, Lee.**, Chiehyeon Lim. (2023). "Theoretical Principles of Controllable Generation: Reinforcing the Levenshtein Agent Mitigates the Discrepancy Problem," *To be submitted to AAAI'24 or ICLR'23*

**Changhun, Lee.**, Chiehyeon Lim. (2023). "Analyzing the Controllability of Language Models and Improving the Control Performance with Reward Dropout," *Under Review in EMNLP'23*

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 opti-

mization 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

\* presenting author; + mentored undergraduate

### CONTRIBUTED PRESENTATIONS

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

## Research Project

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

2021 - present

- Funding Agency: Ministry of Education

DEVELOPING INTELLIGENT BIO-OMICS ANALYSIS TECHNOLOGY

2021 - 2023

- Funding Agency: Ministry of SMEs and Startups

DEVELOP A METHODOLOGY FOR IDENTIFYING LATENT FACTORS EXPLAINING VARIABILITY IN SOCIAL SCIENCE BIG DATA

2020 - 2022

- Funding Agency: Ministry of Education

DEVELOPMENT OF A NON-FACE-TO-FACE PRECISION DIETARY AI SERVICE SYSTEM TAILORED TO THE GUT FLORA OF PEDIATRIC ATOPIC DISEASES

2020-2021

- Funding Agency: Ministry of Science and ICT

DEVELOPMENT OF A DATA REORGANIZATION AND RECOMMENDATION SYSTEM TO REDUCE THE COST OF DRUG DISCOVERY

2019 - 2022

- Funding Agency: Daewoong Pharmaceuticals Foundation

STRUCTURAL ANALYSIS OF THE PROCESS OF TECHNOLOGICAL INNOVATION IN THE FOURTH INDUSTRIAL REVOLUTION

2018 - 2021

- Funding Agency: Ministry of Education

**RESEARCH ON SERVITIZATION IN INDUSTRY 4.0 THROUGH REGIONAL INDUSTRIAL-ACADEMIC COOPERATION**

*2018-2019*

- Funding Agency: Ministry of Science and ICT

**UNDERSTAND THE KEY RESEARCH AND APPLICATION INDUSTRIES OF THE FOURTH INDUSTRIAL REVOLUTION**

*2017-2020*

- Funding Agency: Ulsan National Institute of Science and Technology