

Changhun Lee

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

Ulsan National Institute of Science and Technology, 44919, Ulsan, Republic of Korea

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Education

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

TECHNICAL & RESEARCH CAPABILITIES

- Proficient in Python, R, TensorFlow, Keras, PyTorch, and intermediate in 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

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

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

CONFERENCE PAPERS

Changhun Lee., Chiehyeon Lim. (2024). "Towards Pareto-efficient RLHF: Paying Attention to a Few High-Reward Samples," *under review*

Yeram Kim.*, **Changhun Lee.***, Chiehyeon Lim., Jae Hong Kim., Jiwon Seo. (2024). "PeptoidGen: Antimicrobial Peptoid Sequence Discovery with Submonomer Tokenization and Teacher-Forced REINFORCE," *under review*

Changhun Lee.*, Gyumin Lee.* (2024). "Repurformer: Transformers for Repurposing-Aware Molecule Generation," *ACL Language + Molecules Workshop (Oral)*.

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) (Oral)*.

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

*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.+, 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.+, 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: AAAI 2021, Virtual*

Experience in Academic & Industrial Research Projects

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