

# Changhun Lee

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

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

☎ +82 10 2201 9208 | ✉ changhun@unist.ac.kr | 🏠 <https://chlee-leo.github.io/> | 📄 <https://github.com/CHLEE-Leo>

## 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

- |           |   |
|-----------|---|
| 2024.11-  | <b>Postdoctoral Researcher</b> , Department of Biomedical Informatics, Columbia University    |
| 2023.03-  | <b>Postdoctoral Associate</b> , Graduate School of Artificial Intelligence, UNIST             |
| Present   |   |
| 2019-2022 | <b>Principal Investigator</b> , Granted Research Program, Daewoong Pharmaceuticals Foundation |
| 2021.11-  | <b>Research Advisor</b> , Project-based Learning Program, LG Electronics                      |
| 2021.12   |   |
| 2018-2019 | <b>Co-founder</b> , Data Team, Smart Ship Venture Tech  |
| 2017.07-  | <b>Data Analyst</b> , Business Planning Department, Hyundai Mipo Dockyard                     |
| 2017.12   |   |
| 2016-2017 | <b>Graduate Teaching Assistant</b> , Department of Industrial Engineering, UNIST              |

## Awards, Scholarships, & Grants

- |      |   |
|------|---|
| 2023 | <b>National Academic Research Grant</b> , National Research Foundation of Korea                   |
|      | <b>UNIST Best Research Award</b> , Ulsan National Institute of Science and Technology             |
| 2022 | <b>Prominent Presentation Award</b> , The Korean Nutrition Society                                |
|      | <b>Best Oral Presentation Award</b> , Korean Academy of Pediatric Allergy and Respiratory Disease |
| 2020 | <b>Best Poster Presentation Award</b> , The Korean Nutrition Society                              |
| 2018 | <b>Minister of Science and ICT Award</b> , Korea Institute of Science and Technology              |
|      | <b>Daewoong Foundation Research Scholarship</b> , Daewoong Pharmaceuticals Foundations            |
| 2013 | <b>Student Best Paper Award</b> , Korean Association for Policy Sciences                          |

## Publications

---

\* co-first author

### CONFERENCE PAPERS

**Changhun Lee.\***, Jiwon Kim.\*, Chiehyeon Lim. (2024). “Debiased Medical Report Generation with High-Frequency Amplification,” *Under review*.

**Changhun Lee.**, Chiehyeon Lim. (2024). “Towards Pareto-Efficient RLHF: Paying Attention to a Few High-Reward Samples with Reward Dropout,” *Findings of the Association for Computational Linguistics: EMNLP 2024*.

**Changhun Lee.**, Gyumin Lee. (2024). “Repurformer: Transformers for Repurposing-Aware Molecule Generation,” *Language + Molecules @ ACL 2024 (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

Yeram Kim.\*, **Changhun Lee.\***, Chiehyeon Lim., Jae Hong Kim., Jiwon Seo. (2024). “PeptoidGen: Antimicrobial Peptoid Sequence Discovery with Submonomer Tokenization and Teacher-Forced REINFORCE,” *To be submitted*.

**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

### 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: AAAAI 2021, Virtual*

## Experience in Academic & Industrial Research Projects

---

<b>DEVELOPMENT OF A CONTROLLED SEQUENCE GENERATION MODEL SOLVING THE OBJECTIVES MISMATCH PROBLEM OF DATA-DRIVEN SEQUENCE OPTIMIZATION</b> <ul style="list-style-type: none"><li>• Funding Agency: National Research Foundation of Korea</li></ul>	<i>2023 - present</i>
<b>DEVELOP AND VALIDATE A LEARNING FRAMEWORK FOR INTERACTION AND CO-EVOLUTION BETWEEN HUMANS AND AI</b> <ul style="list-style-type: none"><li>• Funding Agency: Ministry of Education</li></ul>	<i>2021 - present</i>
<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>