Changhun Lee

Ph.D. · Post-Doctoral Researcher · UNIST AIGS

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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 Pharmaceutics 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 Pharmaceutics 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," *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

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: AAAAI 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 — *2023 - present*
- 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

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 Pharmaceutics 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