

DONGHYEOK SHIN

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RESEARCH INTERESTS

My research interests focus on advancing the efficiency of deep learning across various aspects. Currently, I am interested in the following topics:

- **Dataset efficiency:** Dataset Distillation, Coreset Selection
- **Network efficiency:** Knowledge Distillation
- **Inference efficiency:** Fast Sampling of Generative Models

EDUCATION

KAIST, Daejeon, Korea

Mar. 2022 - Present

- Ph.D., Department of Industrial & Systems Engineering
- Advisor: Prof. Il-Chul Moon

KAIST, Daejeon, Korea

Mar. 2020 - Feb. 2022

- M.S., Department of Industrial & Systems Engineering
- Thesis: Dataset Distillation via Loss Approximation for Continual Learning
- Advisor: Prof. Il-Chul Moon

KAIST, Daejeon, Korea

Mar. 2015 - Feb. 2020

- B.S., Department of Mathematical Sciences
- B.S., Department of Industrial & Systems Engineering (Double Major)

PREPRINTS

[P2] **Towards Adversarially Robust VLMs with an Information-Theoretic Approach**

Jiseok Kwak, [Donghyeok Shin](#), Richard Lee Kim, Minsang Park, Zeynep Altiner, and Il-Chul Moon

Under review

[P1] **Towards Pareto-Optimality for Test-Time Adaptation**

JoonHo Jang, [Donghyeok Shin](#), Byeonghu Na, HeeSun Bae, and Il-Chul Moon

Preprint, 2024.

PUBLICATIONS

(*: Equal contribution)

- [C11] **Lookahead Sample Reward Guidance for Test-Time Scaling of Diffusion Models**
Yeongmin Kim, [Donghyeok Shin](#), Byeonghu Na, Minsang Park, Richard Lee Kim, and Il-Chul Moon
International Conference on Machine Learning (**ICML**), 2026 - **Spotlight (Top 2.2%)**
- [C10] **AMiD: Knowledge Distillation for LLMs with α -mixture Assistant Distribution**
[Donghyeok Shin](#), Yeongmin Kim, Suhyeon Jo, Byeonghu Na, and Il-Chul Moon
International Conference on Learning Representations (**ICLR**), 2026
- [C9] **Distillation of Large Language Models via Concrete Score Matching**
Yeongmin Kim, [Donghyeok Shin](#), Mina Kang, Byeonghu Na, and Il-Chul Moon
International Conference on Learning Representations (**ICLR**), 2026
- [C8] **AC-Sampler: Accelerate and Correct Diffusion Sampling with Metropolis-Hastings Algorithm**
Minsang Park, Gyuwon Sim, Hyungho Na, Jiseok Kwak, Sumin Lee, Richard Lee Kim, [Donghyeok Shin](#), Byeonghu Na, Yeongmin Kim, and Il-Chul Moon
International Conference on Learning Representations (**ICLR**), 2026
- [C7] **Diffusion Adaptive Text Embedding for Text-to-Image Diffusion Models**
Byeonghu Na, Minsang Park, Gyuwon Sim, [Donghyeok Shin](#), HeeSun Bae, Mina Kang, SeJung Kwon, Wanmo Kang, and Il-Chul Moon
Neural Information Processing Systems (**NeurIPS**), 2025
- [C6] **Distilling Dataset into Neural Field**
[Donghyeok Shin](#), HeeSun Bae, Gyuwon Sim, Wanmo Kang, and Il-Chul Moon
International Conference on Learning Representations (**ICLR**), 2025
- [C5] **Diffusion Rejection Sampling**
Byeonghu Na, Yeongmin Kim, Minsang Park, [Donghyeok Shin](#), Wanmo Kang, and Il-Chul Moon
International Conference on Machine Learning (**ICML**), 2024
- [C4] **Frequency Domain-based Dataset Distillation**
[Donghyeok Shin](#)^{*}, Seungjae Shin^{*}, and Il-Chul Moon
Neural Information Processing Systems (**NeurIPS**), 2023
- [C3] **Loss Curvature Matching for Dataset Selection and Condensation**
Seungjae Shin^{*}, Heesun Bae^{*}, [DongHyeok Shin](#), Weonyoung Joo, and Il-Chul Moon
Artificial Intelligence and Statistics (**AISTATS**), 2023
- [C2] **Hierarchical Multi-Label Classification with Partial Labels and Unknown Hierarchy**
Suhyeon Jo, [DongHyeok Shin](#), Byeonghu Na, JoonHo Jang, and Il-Chul Moon
ACM International Conference on Information and Knowledge Management (**CIKM**), 2023
- [C1] **Unknown-Aware Domain Adversarial Learning for Open-Set Domain Adaptation**
JoonHo Jang, Byeonghu Na, [DongHyeok Shin](#), Mingi Ji, Kyungwoo Song, and Il-Chul Moon
Neural Information Processing Systems (**NeurIPS**), 2022

AWARDS & HONORS

- Silver Reviewer, ICML 2026
- Winner, Qualcomm Innovation Fellowship Korea 2025 (QIFK 2025)

– Distilling Dataset into Neural Field

- Top Reviewer, NeurIPS 2025
- Grand Prize (1st Prize), Undergraduate Paper Competition in the Korea Software Congress 2017 (KSC 2017), 2017

ACADEMIC ACTIVITIES

Reviewer

- International Conference on Learning Representations (ICLR): 2025, 2026
- Neural Information Processing Systems (NeurIPS): 2025
- International Conference on Machine Learning (ICML): 2026

PROJECTS

Synthetic Data Generation

Mar. 2025 - Present

- Funded by Ministry of Science and ICT of Korea
- Developed a method for synthetic data generation and advanced AI prediction models in exceptional situations.

Semi-supervised Continual Learning

Mar. 2025 - Present

- Funded by SK hynix
- Developed semi-supervised continual learning algorithms for semiconductor images.

Drone Task Planning via LLM

Dec. 2024 - Mar. 2025

- Funded by Information Technology Research Center of Korea
- Developed a pipeline to perform drone task planning with Large Language Model (LLM).

Multi-Modal Dataset Distillation

Nov. 2023 - Dec. 2024

- Funded by Samsung Advanced Institute of Technology (SAIT)
- Developed a parameterization method for multi-modal dataset distillation.

Removed Thickness Prediction

Mar. 2023 - Aug. 2023

- Funded by SK hynix
- Developed a prediction model for removed thickness in CMP process using internal and external factors.

10K Report Analysis

Jun. 2021 - Feb. 2023

- Funded by National Research Foundation of Korea
- Developed an entity-relation extraction model for a comprehensive report using GNN.

Critical Dimension Prediction

Mar. 2021 - May. 2021

- Funded by Samsung Display

- Developed a data-driven virtual metrology model using VAE and Gaussian process regression.

Card Delinquent Profiling

Mar. 2020 - Feb. 2021

- Funded by Hyundai Card
- Developed a prediction model for card delinquents using a neural network with LSTM and VAE.

TEACHING EXPERIENCES

Teaching Assistant

- IE481 Data Structures and Analysis *Fall. 2021*
- IE260 Data Structures and Analysis *Spring. 2022*
- KOOC Introduction to Artificial Intelligence and Machine Learning I *2021*
- KOOC Data Structures and Analysis: Non-Linear Structure, Optimization, and Algorithms *2022, 2023*
- KOOC Data Structures and Analysis: Linear Structure and Dynamic Programming *2023*
- 2nd LG AI Advanced Course *Oct. 2020 - Dec. 2020*