

Hanseul Cho (조한슬)

PHD CANDIDATE AT KAIST AI. EX-INTERN AT GOOGLE NYC. WORKING ON OPT/ML THEORY & LLMs.

📍 Room 9410, Building #9; 85 Heogi-ro, Dongdaemun-gu, Seoul, South Korea

✉️ jhs4015@kaist.ac.kr | 🏠 hanseuljo.github.io | 📄 github.com/HanseulJo

🌐 linkedin.com/in/hanseul-cho | ✉️ @hanseuljo | 🎓 Google Scholar (Hanseul Cho)

Personal Profile

I am a Ph.D. candidate at Kim Jaechul Graduate School of AI of Korea Advanced Institute of Science and Technology (KAIST AI). I am fortunate to be advised by Prof. **Chulhee “Charlie” Yun** of Optimization & Machine Learning (OptiML) Laboratory, KAIST AI. Previously, I worked at Google NYC as an intern (Student Researcher), hosted by Srdinadh Bhojanapalli. Also, I completed my M.Sc. (in AI) and B.Sc. (in Math, minor in CS, Summa Cum Laude) at KAIST.

My primary research interests lie in optimization, machine learning (ML), and deep learning (DL). During my journey to a Ph.D., my ultimate research goal is to **rigorously understand and practically overcome** the following **three critical challenges in ML/DL**:

Generalizability 🏠

Generalization capabilities of modern language models.

(e.g., length generalization and compositional generalization of Transformers)

Adaptability 🌱

Training adaptable models under an evolving environment.

(e.g., continual learning, maintaining the plasticity of neural networks, sample-efficient reinforcement learning)

Multifacetedness 🧩

Learning with multiple (possibly conflicting and/or orthogonal) goals.

(e.g., minimax optimization, bi-level optimization, fairness in ML)

Publications

International Conferences

- [C9] Chang, Hoyeon[☆], Jinho Park[☆], **Hanseul Cho**[☆], Sohee Yang, Miyoung Ko, Hyeonbin Hwang, Seungpil Won, Dohaeng Lee, Youbin Ahn, Minjoon Seo. Characterizing Pattern Matching and Its Limits on Compositional Task Structures. In *Proceedings of the International Conference on Learning Representations (ICLR)*. 2026. [arXiv] [OpenReview]
- [C8] **Cho, Hanseul**[☆], Jaeyoung Cha[☆], Srinadh Bhojanapalli, Chulhee Yun. Arithmetic Transformers Can Length-Generalize in Both Operand Length and Count. In *Proceedings of the International Conference on Learning Representations (ICLR)*. 2025. [arXiv] [OpenReview]
- [C7] Jung, Hyunji[☆], **Hanseul Cho**[☆], Chulhee Yun. Convergence and Implicit Bias of Gradient Descent on Continual Linear Classification. In *Proceedings of the International Conference on Learning Representations (ICLR)*. 2025. [arXiv] [OpenReview]
- [C6] **Cho, Hanseul**[☆], Jaeyoung Cha[☆], Pranjal Awasthi, Srinadh Bhojanapalli, Anupam Gupta, Chulhee Yun. Position Coupling: Improving Length Generalization of Arithmetic Transformers Using Task Structure. In *Advances in Neural Information Processing Systems (NeurIPS)*. 2024. [arXiv] [OpenReview]
- Short version in *ICML 2024 Workshop on Long-Context Foundation Models (LCFM)*.
- [C5] Shin, Baekrok[☆], Junsoo Oh[☆], **Hanseul Cho**, Chulhee Yun. DASH: Warm-Starting Neural Network Training in Stationary Settings without Loss of Plasticity. In *Advances in Neural Information Processing Systems (NeurIPS)*. 2024. [arXiv] [OpenReview]
- Short version in *ICML 2024 Workshop on Advancing Neural Network Training (WANT): Computational Efficiency, Scalability, and Resource Optimization*.
- [C4] Lee, Jaewook[☆], **Hanseul Cho**[☆], Chulhee Yun. Fundamental Benefit of Alternating Updates in Minimax Optimization. In *Proceedings of the International Conference on Machine Learning (ICML)*. 2024. [arXiv] [OpenReview]
- **Spotlight at ICML 2024. (Top 3.5%: (144+191) of 9,473 valid submissions)**
 - Short version in *ICLR 2024 Workshop on Bridging the Gap Between Practice and Theory in Deep Learning (BGPT)*.
- [C3] Lee, Junghyun[☆], **Hanseul Cho**[☆], Se-Young Yun, Chulhee Yun. Fair Streaming Principal Component Analysis: Statistical and Algorithmic Viewpoint. In *Advances in Neural Information Processing Systems (NeurIPS)*. 2023. [arXiv] [OpenReview]
- [C2] Lee, Hojoon[☆], **Hanseul Cho**[☆], Hyunseung Kim[☆], Daehoon Gwak, Joonkee Kim, Jaegul Choo, Se-Young Yun, Chulhee Yun. PLASTIC: Improving Input and Label Plasticity for Sample Efficient Reinforcement Learning. In *Advances in Neural Information Processing Systems (NeurIPS)*. 2023. [arXiv] [OpenReview]
- [C1] **Cho, Hanseul**[☆] and Chulhee Yun. SGDA with Shuffling: Faster Convergence for Nonconvex-PŁ Minimax Optimization. In *Proceedings of the International Conference on Learning Representations (ICLR)*. 2023. [arXiv] [OpenReview]

International Workshop

- Cha, Jaeyoung[☆], **Hanseul Cho**[☆], Chulhee Yun. Layer Verification Accelerates Speculative Tree Decoding. In *ICML 2026 Workshop on Resource-Adaptive Foundation Model Inference (AdaptFM)*. 2026. [OpenReview]

[☆]Co-first authors: These authors contributed equally.

[★]Sole first authors.

Notable Domestic Journals/Conferences

- **Cho, Hanseul**[★], Baekrok Shin[★], Chaewon Moon[★], Sang-Geun Hong, U-Ju Byeon, Jin-Yong Sung, Chulhee Yun. Deep Model-Based Optimization of Jamming Effectiveness under Aircraft AESA Radar Operational Environments. *The Journal of Korean Institute of Communications and Information Sciences (J-KICS)*, vol. 50, no. 11, pp. 1647-1659, 2025. DOI: 10.7840/kics.2025.50.11.1647. [Info]
- Jung, Hyunji[★], **Hanseul Cho**[★], Chulhee Yun. Convergence and Implicit Bias of Gradient Descent on Continual Linear Classification. *Short version in the 11th Joint Conference of Korean Artificial Intelligence Association (JKAIA 2024)*.
 - **Best Paper Award (Top 3) & Oral presentation.**
- **Cho, Hanseul**[★] and Chulhee Yun. SGDA with Shuffling: Faster Convergence for Nonconvex-PL Minimax Optimization. *Short version in the 7th Joint Conference of Korea Artificial Intelligence Association (JKAIA 2022)*.
 - **NAVER Outstanding Theory Paper Award (Top 3) & Oral presentation.**

Education

Korea Advanced Institute of Science and Technology (KAIST)

Seoul, South Korea

Ph.D. in Artificial Intelligence

Sept. 2023 – Current

- Advisor: Prof. Chulhee Yun (Optimization & Machine Learning (OptiML) Laboratory, Kim Jaechul Graduate School of AI (GSAI), KAIST)
- Anticipated Graduation Date: Aug. 2027

KAIST

Seoul, South Korea

M.Sc. in Artificial Intelligence

Mar. 2022 – Aug. 2023

- Advisor: Prof. Chulhee Yun (Optimization & Machine Learning (OptiML) Laboratory, Kim Jaechul Graduate School of AI (GSAI), KAIST)
- Thesis: “Improved Convergence Rate of SGDA by Shuffling: Focusing on the Nonconvex-PL Minimax Problems” (Approved by Prof.’s Chulhee Yun, Se-Young Yun, & Donghwan Kim)
- GPA: 4.22/4.3

KAIST

Daejeon, South Korea

B.Sc. in Mathematical Sciences

Mar. 2017 – Feb. 2022

- Minor in Computing Sciences
- Summa Cum Laude (GPA: 4.05/4.3)

University of Twente

Enschede, Netherlands

Exchange Student Program

Feb. 2020 – Jul. 2020

- Major in Applied Mathematics

Incheon Science High School (ISHS)

Incheon, South Korea

High School

Mar. 2015 – Feb. 2017

- Early graduation by one year (i.e., two-year course)

Experiences

Google

New York, NY, United States

Internship: Student Researcher Program (On-Site), Engineering

May 5th 2025 – Aug. 22nd 2025

- Host: Srinadh Bhojanapalli (Staff Research Scientist at Google DeepMind)
- Notable Co-workers/-advisors: Hrayr Harutyunyan & Amir Keivan Mohtashami (Research Scientists at Google DeepMind)
- Office: Google NYC, 9th Building (111 8th Ave, New York, NY)
- Research Topic: Advanced attention mechanisms of Transformers for long contexts

KAIST 2021 Post-AI Research Project

Daejeon, South Korea

Undergraduate Researcher

May 2021 – Dec. 2021

- Jointly advised by Prof. Sangyoon Yi (DS Lab, GSFS, KAIST) & Prof. Jinkyoo Park (Sys. Int. Lab, ISysE, KAIST)
- Project: Research on ‘AI-augmented Organizations’ of Collaborative Decision Making and Learning. My contributions are as follows:
 1. *Algorithm Design*: Devised a model-based randomized algorithm for a single-player finite-horizon NK landscape optimization game
 2. *Experiment Assistant*: Conducted human-subject experiments on human-AI cooperation based on the algorithm that I devised

Individual Study: Optimization for Deep Learning

Daejeon, South Korea

Undergraduate Student @ KAIST

Mar. 2021 – Jun. 2021

- Advised by Prof. Jinwoo Shin (ALIN Lab, GSAI, KAIST)
- (1) Gradient-based optimizers for large-batch setting (e.g., LARS & LAMB); (2) Theoretical analysis on gradient clipping (paper reading)

Individual Study: Deep Learning in Computer Vision

Daejeon, South Korea

Undergraduate Student @ KAIST

Sep. 2020 – Feb. 2021

- Advised by Prof. Jong-chul Ye (BISPL, BBE, KAIST)
- Assignment: Semantic segmentation of kidney tumor with U-Net (with KiTS19 challenge dataset)
- Self-taught PyTorch coding on Linux Ubuntu

Individual Study: Statistical Learning Theory

Daejeon, South Korea

Undergraduate Student @ KAIST

Jun. 2020 – Aug. 2021

- Advised by Prof. Yeonseung Chung (MAS, KAIST)
- Resource: Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani. "An Introduction to Statistical Learning: with Applications in R." Springer, 2013. [\[link\]](#)

Seminars

SNU-KAIST AI/ML Theory Workshop

Gangneung, South Korea

Organizer

Aug. 12th–14th, 2024

- Homepage: nick-jhlee.github.io/snu-kaist-workshop
- Jointly organized by three research groups of Prof. Ernest K. Ryu, Prof. Min-hwan Oh, and Prof. Chulhee Yun.

Machine/Deep Learning Theory + Physics (MDLTP) Seminar

Seoul, South Korea

Organizer

Jul. 2022 – Feb. 2023

- Homepage: sites.google.com/view/mdlt-p
- Jointly organized by OSI Lab, OptiML, and CSSPL
- Topics: Learning theory, loss landscape, trajectory analysis, (stochastic) optimization, high-dimensional statistics, statistical/mathematical physics, scientific machine learning, and more.

Geometric Deep Learning Seminar

Seoul, South Korea

Participant

2022

- A seminar organized by OptiML and OSI Lab
- Resources: [\[Homepage\]](#) [\[Lecture Videos\]](#) [\[Book\]](#)

Awards

2026	Gold Reviewer (Top 25%: 4,439 of 17,749 reviewers) , ICML 2026	Seoul, South Korea
2025	Top Reviewer (Top 1.88%: 206 of 10,943 reviewers) , ICML 2025	Vancouver, Canada
2024	Best Paper Award (Top 3) , JKAIA 2024	South Korea
2024	Top Reviewer (Top 8.60%: 1,304 of 15,160 reviewers) , NeurIPS 2024	Vancouver, Canada
2022	NAVER Outstanding Theory Paper Award (Top 3) , JKAIA 2022	South Korea
2022	Summa Cum Laude , Bachelor's, KAIST	South Korea
2017 – 2020	The National Scholarship for Science and Engineering , Korea Student Aid Foundation	South Korea
2017 Fall	Dean's List , The School of Freshman, KAIST	South Korea

Services

Top-tier ML Conference/Journal Reviewer (35 papers)

From time to time

- NeurIPS: 2023 (🏆🏆), 2024* (🏆🏆🏆🏆🏆), 2025 (🏆)
 - NeurIPS 2024: awarded Top Reviewer (Top 8.60%: 1,304 of 15,160 reviewers).
- ICML: 2025* (🏆🏆🏆🏆🏆), 2026 (🏆🏆🏆🏆🏆)
 - ICML 2025: awarded Top Reviewer (Top 1.88%: 206 of 10,943 reviewers).
 - ICML 2026: awarded Gold Reviewer (Top 25%: 4,439 of 17,749 reviewers).
- ICLR: 2024 (🏆🏆), 2025 (🏆🏆), 2026 (🏆🏆🏆).
- TMLR (🏆🏆🏆).

1st GPU server manager of OptiML lab

June 2022 – Feb 2024

- Being involved in installing OptiML lab's very first 5 GPU servers and a storage server
- Allocating GPU nodes to lab members
- Managing errors occurred in the servers

- Calculus II (2018–2019; 3 times)
- Introduction to Programming (Fall 2021)

Languages

- English** Professional Proficiency (i.e., sufficient for academic activities)
- Korean** Native proficiency
- Others** Had some introductory courses on French, German, Classical Latin, & Chinese.

Skills

- Programming** Familiar: **Python** 🐍 (**PyTorch, NumPy, Scikit-learn, Jupyter, Pandas, JAX, etc.**), **MATLAB**.
Novice: C, C++, CUDA, R, HTML/CSS, Scala
- Computer Misc.** Familiar: **LaTeX** (Overleaf/VSCoDe/MacTex), **Git** 📄, **Microsoft Office, Keynote**
Novice: Adobe products (Lightroom, Premiere Pro, After Effects, Photoshop)
- Music & Hobby** Playing the drums and percussion 🥁. Begun to learn in 2009.
Joined and performed with the music bands listed below as an amateur drummer:
- ISHS: *Cha-rang* (2015–2016)
 - KAIST: *Muse KAIST* (2017–2019) → *Carpe Diem* (2019)
 - Club “Music Space”: Team *Woodstone* (2024–2025)
 - Team “*Kira-Kira Yoon*(tentative name)” (2025–current)
- Also, I am a huge music fan, especially for jazz, funk, K-indie, rock, blues, Latin, house, and many more.