

Hanseul Cho (조한슬)

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Personal Profile

I am a Ph.D. student in the Optimization & Machine Learning (OptiML) Laboratory, advised by Prof. Chulhee Yun at Kim Jaechul Graduate School of AI (GSAI) in Korea Advanced Institute of Science and Technology (KAIST). Before this, I received my Bachelor's degree in Mathematical Sciences (major) and Computing Sciences (minor) at KAIST in 2022.

My primary research interests lie in optimization, machine learning, and deep learning, mainly focusing on theoretical analysis of them. Recently, I have been looking at topics on various constrained and/or multi-level optimization problems, including minimax optimization (*i.e.*, saddle point problem), fair machine learning, reinforcement learning, and more, with particular interest.

Education

Korea Advanced Institute of Science and Technology (KAIST)

Seoul, Republic of 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)

Korea Advanced Institute of Science and Technology (KAIST)

Seoul, Republic of 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 Chulhee Yun, Se-Young Yun, & Donghwan Kim)

Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, Republic of Korea

B.Sc. in Mathematical Sciences

Mar. 2017 - Feb. 2022

- Minor in Computer 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

Incheon, Republic of Korea

High School

Mar. 2015 - Feb. 2017

- Early Graduation (two-year course)

Publications

INTERNATIONAL CONFERENCES/JOURNALS

- Lee, Junghyun*, Hanseul Cho*, Se-Young Yun, Chulhee Yun. "Fair Streaming Principal Component Analysis: Statistical and Algorithmic Viewpoint." **NeurIPS 2023**. [OpenReview]
- 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." **NeurIPS 2023**. [OpenReview] [arXiv]
- Cho, Hanseul and Chulhee Yun. "SGDA with shuffling: faster convergence for nonconvex-PL minimax optimization." **ICLR 2023**. [OpenReview] [arXiv]

DOMESTIC CONFERENCES/JOURNALS

- Cho, Hanseul and Chulhee Yun. SGDA with shuffling: faster convergence for nonconvex-PL minimax optimization. Short version in 2022 *Korea AI Association + NAVER Autumnal Joint Conference (JKAIA 2022)*.
 - NAVER Outstanding Theory Paper Award & Spotlight presentation.
- Cho, Hanseul*, Junghyun Lee*, Se-Young Yun, Chulhee Yun. Fair Streaming Principal Component Analysis: Statistical and Algorithmic Viewpoint. 2023 *Korea AI Association Summer Conference (CKAIA 2023)*.
- Lee, Hojoon*, Hanseul Cho*, Hyunseung Kim*, Daehoon Gwak, Joonkee Kim, Jaegul Choo, Se-Young Yun, Chulhee Yun. Enhancing Generalization and Plasticity for Sample Efficient Reinforcement Learning. *CKAIA 2023*.

Experiences

Machine/Deep Learning Theory + Physics (MDLTP) Seminar

Seoul, Republic of Korea

(Co-)Organizer

Jul. 2021 – 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.

KAIST 2021 Post-AI Research Project

Daejeon, Republic of Korea

Undergraduate Researcher

May 2021 – Dec. 2021

- Jointly advised by Prof. Sangyoon Yi (SOIL Lab, GSFS, KAIST) & Prof. Jinkyoo Park (Sys. Int. Lab, ISyE, KAIST)
- Project: Research on 'AI-augmented Organizations' of Collaborative Decision Making and Learning
- Contribution: (1) Devised a model-based randomized algorithm for a single-player finite-horizon NK landscape optimization game; (2) Conducted some experiments on human-AI cooperation based on the algorithm that I devised

Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, Republic of Korea

Individual Study

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)

Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, Republic of Korea

Individual Study

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)

Korea Advanced Institute of Science and Technology (KAIST)

Daejeon, Republic of Korea

Individual Study

Jun. 2020 – Aug. 2021

- Advised by Prof. Yeonseung Chung (MAS, KAIST)
- Statistical learning theory

Services

Reviewer

- NeurIPS 2023. (2 papers)

Awards

2022	NAVER Outstanding Theory Paper Award , JKAIA 2022	Republic of Korea
2022	Summa Cum Laude , Bachelor's, KAIST	Republic of Korea
2017 – 2020	The National Scholarship for Science and Engineering , Korea Student Aid Foundation	Republic of Korea
2017 Fall	Dean's List , The School of Freshman, KAIST	Republic of Korea

Skills

Programming	Familiar: Python (PyTorch, NumPy, Scikit-learn, Jupyter, Pandas, etc.), MATLAB. Novice: C, C++, R, HTML/CSS, Scalar
Computer Misc.	Familiar: \LaTeX (Overleaf/VSCode), Git, Microsoft Office. Novice: Adobe (Lightroom, Premiere Pro, After Effects, Photoshop)
Music	Playing the drums and percussions

Languages

English	Sufficient for academic activities: TOEIC score 925 (LC 460, RC 465) (2021.04.11)
Korean	Native proficiency
Others	Had some introductory courses on French, German, Classical Latin, & Chinese.