Hanseul Cho (조한슬)

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Personal Profile

I am a Master's candidate 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**) Laboratoy, 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**) Laboratoy, Kim Jaechul Graduate School of AI (GSAI), KAIST)

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)

Publication

INTERNATIONAL CONFERENCES/JOURNALS

- Cho, Hanseul and Chulhee Yun. SGDA with shuffling: faster convergence for nonconvex-PŁ minimax optimization. **ICLR 2023**. [OpenReview] [arXiv]

DOMESTIC CONFERENCES/JOURNALS

- Cho, Hanseul and Chulhee Yun. SGDA with shuffling: faster convergence for nonconvex-PŁ minimax optimization. Short version in *2022 Korea AI Association + NAVER Autumnal Joint Conference* (*JKAIA 2022*).
  - **NAVER Outstanding Theory Paper Award** & **Spotlight presentation.**

Preprint

- 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. *Under Review*.
- Lee, Junghyun*, Hanseul Cho*, Se-Young Yun, Chulhee Yun. Fair Streaming Principal Component Analysis: Statistical and Algorithmic Viewpoint. *Under Review*.

Experiences

Machine/Deep Learning Theory + Physics (MDLTP) Seminar — *Seoul, Republic of Korea*

(Co-)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.

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, ISysE, KAIST)
- Project: Research on 'AI-augmented Organizations' of Collaborative Decision Making and Learning
- Contribution: (1) Devised a model-based randomized algorithm for 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

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.