# JAEWOOK LEE

## Curriculum Vitae

## **Personal Information**

Address	Kim Jaechul Graduate School of AI,	Phone	+82-10-3539-1857
	Korea Advanced Institute of Science and Technology,	Email	99rma37 (at) kaist.ac.kr
	85 Hoegi-ro, Dongdaemun-gu, Seoul, South Korea	Website	id8198.github.io

## Education

(Prospective)	Stanford University Ph.D. in Electrical Engineering	Stanford, CA, United States
Feb 2025	Korea Advanced Institute of Science and Technology M.S. in Artificial Intelligence (Advisor: Prof. Chulhee Yun) GPA: 4.25/4.3	Seoul, South Korea
Feb 2023	Korea Advanced Institute of Science and Technology B.S. in Electrical Engineering & Mathematical Sciences ( <i>Double Majo</i> GPA: 4.07/4.3, <b>SUMMA CUM LAUDE</b> <i>Graduated with Excellence in Leadership and Volunteer Activity</i>	Daejeon, South Korea
Feb 2018	Sejong Science High School	Seoul, South Korea

## **Research Interests**

I am interested in **optimization theory**, including both classical convex/nonconvex/stochastic optimization and applications to practical problem settings in AI/ML. This includes optimization & sampling algorithms, deep learning theory, fairness (as constrained optimization), and the optimization dynamics of transformers. Recently, I have been particularly interested in **Wasserstein gradient flows** and applications to deep learning theory.

I specialize in **minimax optimization** and similar topics like monotone operator theory and variational inequalities. I am currently working on the convergence analysis of accelerated first-order minimax optimization algorithms. I am also interested in broader topics like multi-player games and multi-agent learning as well. I also currently have ongoing research on **block coordinate descent**, which could also be thought of as a purely cooperative *n*-player game.

## Publications

- [1] Donghwa Kim, **Jaewook Lee**, Chulhee Yun. Provable Benefit of Random Permutations over Uniform Sampling in Stochastic Coordinate Descent. *International Conference on Machine Learning (ICML)*, 2025.
- [2] Jaewook Lee\*, Hanseul Cho\*, Chulhee Yun. Fundamental Benefit of Alternating Updates in Minimax Optimization. International Conference on Machine Learning (ICML), 2024. Spotlight.
- [3] Jaeyoung Cha, Jaewook Lee, Chulhee Yun. Tighter Lower Bounds for Shuffling SGD: Random Permutations and Beyond. *International Conference on Machine Learning (ICML)*, 2023. *Oral*.

\*Equal Contribution.

## **Experiences**

**Optimization & Machine Learning and Intelligence Lab (OptiML Lab) Research Intern** (Advisor: Prof. Chulhee Yun, KAIST AI)

• Worst-case convergence lower bounds of gradient-based optimization algorithms

#### Machine Learning & Intelligence Lab (MLILAB) Research Intern (Advisor: Prof. Eunho Yang, KAIST AI)

- Implemented talking head video generation based on GANs, 3D morphable face models, and neural renderers
- Participated in the MLILAB weekly group paper study (*Reading & implementing one paper per week*)

Jun 2022 – Feb 2023

Jul 2021 – Mar 2022

#### National Institute of Environmental Research (NIER) Government Research Project

• Real-time ozone concentration prediction (Time-series prediction using real chemical & meteorological data)

### Talks

Aug 22 <sup>nd</sup> , 2024	2024 Digital Innovators' Symposium, Seoul, South Korea (page)
	Title: Fundamental Benefit of Alternating Updates in Minimax Optimization
Aug 13 <sup>th</sup> , 2024	SNU-KAIST AI/ML Theory Workshop, Gangneung, South Korea (page)
	Title: Exploiting Coordinate Structures in Optimization Algorithms

## Awards & Honors

2024	ICML, <b>Spotlight Paper</b>
2023	ICML, Oral Presentation
Fall 2021	Simon Marais Mathematics Competition, Top Quartile (Rank 16/132)
	Asia-Pacific undergraduate math contest (Pair with DeukHyeon Kwon)
Fall 2021	KAIST MAS, <b>PoW (Math Problem of the Week)</b> - 3 <sup>rd</sup> Prize
	Math problem-solving competition for the Fall semester
Spring 2021	KAIST EE, Dean's List Award
	Awarded to the top 3% of all EE students
Fall 2020	KAIST EE, Academic Excellence Scholarship
	Awarded to the top 4 students in EE
Fall 2020	KAIST EE, <b>Dean's List Award</b>
Fall 2019	KAIST EE, <b>Dean's List Award</b>
Fall 2018	KAIST, Freshman Dean's List Award
	Awarded to the top 3% of all freshman students

## **Professional Services**

Journal/Conference Reviewer. JMLR 2024, NeurIPS 2024, ICLR 2025, ICML 2025

# **Teaching Experience**

KAIST Freshman Tutoring Program. Calculus II (2020 Fall, 2022 Spring) General Physics I (2019 Spring)

## Skills

Languages. English (*Highly Proficient*), Korean (*Native*) TOEFL 115/120 (R29/L30/S29/W27), TOEIC 985/990 Computer Languages. Python (PyTorch Libraries), MATLAB, Julia, ETEX

## **Extracurricular Activities**

2025	Project Starlight Orchestra First Violinist
2023	Merry Orchestra, Original First Violinist
2018-2022	KAIST Orchestra First Violinist (2019 Concertmaster)
2020-2022	KAIST CGC (Communication Globalization Committee), English Translator
2018-2021	KAIST EDGE (Table Tennis Club) Member
2020-2021	KAIST UA (Undergrad. Assoc.) Bureau of Welfare & Bureau of International Affairs
2020-2021	KAIST FEEL (EE Conference Camp, link) Program Director
2021	KAIST 50 <sup>th</sup> Anniversary Conference "Pioneers: 2071"
	Program Director (Scenario Author & Assistant MC)
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2018-2019 KAIST FSC (Freshman Student Council)