

Yueun Lee

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EDUCATION

Courant Institute, New York University (NYU), US

Expected Start: Sep. 2027

Ph.D. in Mathematics

Seoul National University (SNU), Korea

Mar. 2021 – Aug. 2025 (Expected)

B.S. in Statistics, Mathematics, and Computer Science & Engineering

- Major GPA: Overall 4.11, Stats 4.04, Math 4.27, CS&E 4.05 (out of 4.3)

Seoul Science High School, Korea

Mar. 2018 – Feb. 2021

School for gifted students in science and mathematics

RESEARCH INTERESTS

Machine Learning: Statistical Machine Learning, Deep Learning Theory, Reinforcement Learning

Numerical Analysis: Numerical Linear Algebra, Optimization

PUBLICATIONS

Published:

- [1] G. Hwang, Y. Park, **Y. Lee**, and M. Kang. “Analysis of efficient preconditioner for solving Poisson equation with Dirichlet boundary condition in irregular three-dimensional domains”. In: *Journal of Computational Physics* 519 (2024), p. 113418. DOI: <https://doi.org/10.1016/j.jcp.2024.113418>

Submitted:

- [2] Y. Park, **Y. Lee**, J. Hahn, M. Kang, and G. Hwang. *Half-order Preconditioning of Diffusion Equations Using MILU*. Submitted to *Journal of Computational Physics*. 2024
- [3] H. Lee, **Y. Lee**, M. Imaizumi, and J. Won. *Minimax Optimal Estimation of Distributions with Wasserstein Autoencoders using Exact Penalties*. Submitted to *Journal of the American Statistical Association*. 2024
- [4] G. Hwang, Y. Park, **Y. Lee**, J. Hahn, and M. Kang. *Localized Estimation of Condition Numbers for MILU Preconditioners on a Graph*. Submitted to *SIAM Journal on Numerical Analysis*. 2024. URL: <https://arxiv.org/abs/2501.00245>

RESEARCH EXPERIENCE

Machine Learning Researcher, ENERZAI Inc., Korea

Jun. 2025 — Jun. 2027 (Expected)

Mandatory Military Service as an Industrial Technical Personnel

- Low-bit quantization for language models

Undergraduate Intern, Numerical Computing & Image Analysis Group

Mar. 2024 – May. 2025

Advisor: Myungjoo Kang (Dept. of Mathematics, SNU)

- Analyzed condition number scaling for diffusion equation discretizations and proved Modified Incomplete LU (MILU) preconditioner reduces condition number by half-order for Dirichlet boundary conditions on irregular domains, with theoretical results validated through numerical experiments [2]
- Generalized MILU preconditioners for graph structures and proposed Localized Estimator of Condition Number (LECN) providing upper bounds, with versatility demonstrated across uniform grids, high-order schemes, and hierarchical meshes [4]

- Analyzed MILU preconditioners for Poisson equations on 3D irregular domains, demonstrating half-order reduction in condition number and developed Sectored-MILU method with superior performance over standard MILU [1]

Undergraduate Intern, Statistical Computing Lab

Dec. 2023 – Dec. 2024

Advisor: Joong-Ho Won (Dept. of Statistics, SNU)

- Simulated penalty methods for Wasserstein Autoencoders, proving exact penalty properties of transformed f -divergences [3]
- Analyzed stochastic optimization algorithms with focus on KKT conditions, Lagrange duality, and batch methods (\$500 funded by SNU)

Undergraduate Intern, Oh Reinforcement Learning Group

Jun. 2024 – Sep. 2024

Advisor: Min-hwan Oh (Graduate School of Data Science, SNU)

- Studied bandit algorithms and regret bounds in reinforcement learning, covering stochastic/adversarial and linear bandits

Undergraduate Intern, IDEA Lab

Jun. 2023 – Aug. 2023

Advisor: Yongdai Kim (Dept. of Statistics, SNU)

- Reviewed optimal transport literature and explored gradient-based algorithms (\$500 funded by SNU)

HONORS AND AWARDS

The National Presidential Science Scholarship in Mathematics

2021 – 2024

Korea Student Aid Foundation

- Full tuition and a \$5,000 annual stipend for distinguished undergraduates from the Korean government

Undergraduate Mathematics Competition: 1st Award

Dec. 2023

Korean Mathematics Society

- Achieved the highest score among all participants, receiving a monetary prize of \$800

Korea Mathematics Olympiad - Final round: Excellence Award

Jul. 2020

Korean Mathematics Society

- Top 27 participants in a competitive qualifier for the national IMO team selection

Korea Mathematics Olympiad: Gold Award

Dec. 2018, Dec. 2019

Korean Mathematics Society

- Top 28, 26 participants in a prestigious mathematics competition for high school students

International Mathematics Tournament of Towns: Gold Award (Top Gold Winner)

Dec. 2018

Korean Organizing Committee

- 1st place nationally in the Senior A-level (Advanced) with challenges similar to IMO

Iranian Geometry Olympiad: Gold Award (Top Gold Winner)

Oct. 2018

Iranian Mathematical Society

- 1st place among international participants in a prestigious geometry competition

SKILLS

C/C++, Python (advanced), **Java, R, Julia** (intermediate)

LANGUAGES

English (fluent), **Korean** (native)