Donghwan Rho

📍 Seoul, South Korea ✉️ donghwan_rho@snu.ac.kr 📞 +82-10-7713-6586 🔗 Website in LinkedIn ⊙ Github

Research Interests

- Implementing Language Models Under Homomorphic Encryption
- Mathematical Reasoning in Large Language Models
- Interpretability of Language Models

Education

Ph.D.	**Seoul National University**, Mathematical Sciences	Mar. 2021 – Present

- Advisor: *Ernest K. Ryu* ↗
- Expected Graduation: Feb. 2026

BS	**Korea University**, Mathematics Education	Mar. 2015 – Feb. 2021

- Graduated 1st in Class
- (Mandatory) Military Service: May 2017 - Jan. 2019
- Teacher's Certificate for Secondary Regular Teacher of Mathematics.

Experience

Workshop Coordinator, SNU-KAIST ML Theory Workshop — Gangneung, South Korea / Aug. 2024

- Assisted in planning the schedule, selecting the venue, and managing workshop programs.

Teaching Practicum — Seoul, South Korea / Apr. 2020 - May 2020

- Danggok high school.

Militery Service, Auxiliary Police — Seoul, South Korea / May 2017 – Jan. 2019

- Assisted in maintaining public order and security.

Publications

∗: Equal Contribution

[2] **Homomorphically Encrypted Language Models Stabilized with TSP-Sorted Tokens**
Donghwan Rho*, Sieun Seo*, Hyewon Sung, Chohong Min, Ernest K. Ryu
In Progress

[1] **Encryption-Friendly LLM Architecture** — Oct. 2024
Donghwan Rho*, Taeseong Kim*, Minje Park, Jung Woo Kim, Hyunsik Chae, Ernest K. Ryu, Jung Hee Cheon
International Conference on Learning Representations (ICLR) 2025
Paper ↗ Code ↗

Talks & Presentations

SNU-Samsung Electronics Collaboration Symposium, Poster Presentation — Aug. 2024

- Title: Encryption-Friendly LLM Architecture

SNU-KAIST ML Theory Workshop, Poster Presentation — Aug. 2024

- Title: Encryption-Friendly LLM Architecture

Honors and Awards

University Students Contest of Mathemaitcs, Silver Prize   Dec. 2018

Academic Excellence Scholarship, Korea University   Aug. 2015

Teaching

Peer Tutoring in Basic Sciences, Lead Teaching Assistant   Mar. 2024 - Present
- Represented section TAs to ensure the smooth operation of the peer tutoring program.
- Oversaw tutorings in Mathematics, Physics, Chemistry, Biology, and Statistics.

Basic Calculus, Teaching Assistant   Sep. 2021 - Present
- Matched tutors and tutees for the *Basic Calculus* peer tutoring program.
- Managed program logistics to ensure efficient operation.

SNU Pre-College Program, Head TA, Instructor
- Managed logistics of the mathematics program for freshman undergraduate.
- Gave lectures.
- Winter 2024, Winter 2023, Winter 2022

Introduction to Computer Programming and Artificial Intelligence for Scientists,   Spring 2025
Instructor
- English Course

Topics in Machine Intelligence   Fall 2024
- Topics: Continuous-depth neural networks, Diffusion Models, Large Language Models, Vision Language Models, State-space Models
- English Course
- Graduate Course

Mathematical algorithms II   Fall 2022
- Topics: Reinforcement Learning, Diffusion Models, Natural Language Processing
- English Course
- Graduate Course

Calculus 2 Practice, Instructor   Fall 2021

Calculus 1 Practice, Instructor
- Spring 2024, Fall 2023, Spring 2023, Spring 2022, Spring 2021

Technical Skills

Languages: Korean (Native), English (Fluent)

Programming Languages: Python, C++

Tools & Technologies: LaTeX, GitHub