Yeongmin **Kim**

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A Bridger of Math, Biology, and AI

About me

I am a senior student at KAIST, majoring in mathematics. I actively participated in research projects in the SNU VMBI lab supervised by Younghee Lee and the DSAIL lab supervised by Chanyoung Park. My research interest covers various academic domains, such as bioinformatics, machine learning, and graph foundation models. Currently, I am a soldier in the Republic of Korea Navy. (Jul 29.2024 Mar 28.2026)

Education

KAIST (Korea Advanced Institute of Science and Technology)

Daejeon, S.Korea

Senior, Department of Mathematics — *Mar. 2022-*

- GPA: 4.24/4.3, with 113 credits completed
- Dean's list in 1st, 3rd, 4th, and 5th semester
- Got A+ in Modern Algebra I, Complex Variables I, Graph Machine Learning and Mining, Statistical Machine Learning, and Cell Biology Experiment.

Research experience

AltUB: Alternating training method to update base distribution of normalizing flow for anomaly detection.

Daejeon, S.Korea

First author — *Mar. 2022 - Dec. 2022*

- **Yeongmin Kim**†, Huiwon Jang†, DongKeon Lee, Ho-Jin Choi, available from arXiv (10+ citations)
- Expanded a school project, following TA's suggestion.
- Discovered a defect of normalizing flow, achieved SOTA in MVTec and BTech dataset.

A machine learning approach using conditional normalizing flow to address extreme class imbalance problems in personal health records

Seoul, S.Korea

First author — *Aug. 2022 - Jun. 2023*

- **Yeongmin Kim**†, Wongyung Choi†, Woojeong Choi, Grace Ko, Seonggyun Han, Hwan-Cheol Kim, Dokyoon Kim, Dong-gi Lee, Dong Wook Shin, Younghee Lee
- Published in BioData Mining.
- First utilized normalizing flow to classify chronic diseases, and achieved the higher performance than the other models.
- Presented the research in the 2022 Fall Korean society of medical informatics.
- Veterinary informatics and Bioinformatics Lab in Seoul National University (Prof. Younghee Lee)

Classification of Alzheimer's disease and progressive supranuclear palsy from a comprehensive machine learning analysis with alternative splicing exons

Seoul, S.Korea

First author — *Feb. 2023 - PRESENT*

- **Yeongmin Kim**†, Seonggyun Han†, Younghee Lee
- Identified alternative splicing patterns differed between Alzheimer's disease and progressive supranuclear palsy.
- Compared several machine learning approaches for robust discovery, and evaluated generalization.
- Under revision in Computers in Biology and Medicine (IF-7.0)
- Veterinary informatics and Bioinformatics Lab in Seoul National University (Prof. Younghee Lee)

Single-cell RNA sequencing data imputation using bi-level feature propagation

Daejeon, S.Korea

Third author — *Sep. 2023 - May. 2024*

- Junseok Lee, Sukwon Yun, **Yeongmin Kim**, Tianlong Chen, Manolis Kellis, Chanyoung Park
- Published in Briefings in Bioinformatics.
- Analyzed single-cell RNA (scRNA) data that was imputed using the algorithm, and biologically evaluated how effectively the data discriminate between lung carcinoids and normal tissues.
- Data Science & Artificial Intelligence Lab at KAIST (Prof. Chanyoung Park)

Global Context-aware Representation Learning for Spatially Resolved Transcriptomics *Daejeon, S.Korea*

THIRD AUTHOR *Sep. 2023 - May. 2025*

- Yunhak Oh†, Junseok Lee†, **Yeongmin Kim**, Sangwoo Seo, Namkyeong Lee, Chanyoung Park
- Published in ICML 2025 (International Conference on Machine Learning)
- Participated in the whole process, especially providing biological motivation for the proposed methodology.
- Identified mathematical foundation of the methodology with topology and differential equations, and conducted biological experiments (specifically, identification of differentially expressed genes from spatial transcriptomics datasets) to support the paper.
- Data Science & Artificial Intelligence Lab at KAIST (Prof. Chanyoung Park)

Lab experience

Veterinary informatics and Bioinformatics Lab in Seoul National University (Prof. Younghee Lee) *Seoul, S.Korea*

UNDERGRADUATE RESEARCHER *Sep. 2022 - Aug. 2023*

- Focusing on application of machine learning on clinical data and expression data, presented two papers as the first author.

Data Science & Artificial Intelligence Lab at KAIST (Prof. Chanyoung Park) *Daejeon, S.Korea*

UNDERGRADUATE RESEARCHER *Sep. 2023 - PRESENT*

- Supported mathematical and biological discussion for developed graph models. Contributed to three bioinformatics papers.

Work experience

Republic of Korea Navy (ROK Navy) *S.Korea*

BIG DATA ANALYST (SPECIAL MILITARY SERVICE) *Jul. 2024 - Mar. 2026*

- Selected as 1 of only 2 Big Data Analysts in the ROK Navy under the Technical Military Service Program.
- Analyzed large-scale operational and administrative datasets to support strategic decision-making and mission planning.

Awards & Scholarship

AWARDS

2025	**Winner**, 2025 Navy & Marine Corps AI Competition - Award presented by the Chief of Naval Operations	*S. Korea*
2023	**3rd place**, ECG AI Challenge (Seoul National University Hospital)	*S. Korea*
2022	**Top prize**, Data Science Contest (KAIST-POSTECH-UNIST IE)	*S. Korea*
2021	**Grand prize**, 67th Science Fair	*S. Korea*

SCHOLARSHIP

2022	**Presidential Science Scholarship**, 4 years	*S.Korea*
2023	**Alumni Scholarship (KAIST)**, 3 years	*S.Korea*
2023	**Departmental Honors Scholarship**, Spring, Fall	*S.Korea*
2024	**Departmental Honors Scholarship**, Spring	*S.Korea*

Extracurricular Activity

Include (Artificial intelligence club in KAIST) *Daejeon, S.Korea*

CORE MEMBER *2022 - PRESENT*

- Introduced several papers as capsule network.
- Developed curriculum for machine learning and deep learning