# Minseong Bae

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## Education

**KAIST** *Sep 2025 – Current*
*M.S. in Computer Science*
- Cumulative GPA: 4.30/4.30 (100/100)

**Korea University** *Mar 2021 – Aug 2025*
*B.E. in Computer Science & Engineering*
*B.S. in Mathematics* (Double Major)
- Cumulative GPA: 4.37/4.50 (98.7/100, 148/130 credits)
- Graduated with **Great Honor**

**Busan Science High School** *Mar 2018 - Feb 2021*
*High School Diploma*

## Research Interests

My research interests span machine learning and deep learning, with a focus on **geometric deep learning** [C1, U1-2], **diffusion/flow-based generative models** [U1], and **multimodal learning** [C1-3]. Nowadays, I'm mainly interested in **RL-based post-training** methods for generative models.

I'm also very interested in applying machine learning to natural sciences and tackling impactful real-world problems (**AI4Science**). So, I have been working on multimodal language models, diffusion-based generative models and agentic systems for **biomolecules** [C1-2] and **weather patterns** [U1].

My long-term research goal is to develop **robust** and **scalable** learning methods that enable a **self-evolving human-collaborative agent** for scientific discovery.

## Experiences

**Research Assistant** *Daejeon, South Korea*
*MLV Lab, KAIST* *Feb 2025 – Current*
- **Advisor:** Prof. Hyunwoo J. Kim
- Researching foundation and generative models across diverse domains, including multimodal scientific data.

**Undergraduate Student Researcher** *Seoul, South Korea*
*MLV Lab, Korea University* *Jul 2022 – Jan 2025*
- **Advisor:** Prof. Hyunwoo J. Kim
- Explored various research topics, including machine learning on graphs, diffusion models, and multimodal large language models during a research internship. (2022-2023)
- Researched large molecule-language models and AI-based weather forecasting. (2024-2025)

## Publications

### 2026

**[C3] TabFlash: Efficient Table Understanding with Progressive Question Conditioning and Token Focusing**

Jongha Kim, **Minseong Bae**, Sanghyeok Lee, Jinsung Yoon, Hyunwoo J. Kim

*The 40th Annual AAAI Conference on Artificial Intelligence* (AAAI 2026)

**[C2] Improving Large Molecular Language Model via Relation-aware Multimodal Collaboration**

Jinyoung Park, **Minseong Bae**, Jeehye Na, Hyunwoo J. Kim

*The 40th Annual AAAI Conference on Artificial Intelligence* (AAAI 2026)

### 2024

**[C1] LLaMo: Large Language Model-based Molecular Graph Assistant**

Jinyoung Park, **Minseong Bae**, Dohwan Ko, Hyunwoo J. Kim

*Thirty-Eighth Annual Conference on Neural Information Processing Systems* (NeurIPS 2024)

### Under Review

**[U2] Density-Controllable Feed-Forward 3D Gaussian Splatting**

Injae Kim, Chaehyeon Kim, **Minseong Bae**, Minseok Joo, Hyunwoo J. Kim

**[U1] G-WIND: Graph-Based Probabilistic Weather Forecasting with Latent Diffusion**

Minseo Yoon, Jinyoung Park, Seunghoon Lee, **Minseong Bae**, Jaewon Chu, Hyunwoo J. Kim

## Awards & Scholarships

**Honorable Mention, The 4th NIMS Weather-AI Boostcamp** *2025*

- Participated as a team leader in a hackathon program held in conjunction with the WMO (World Meteorological Organization) AINPP (Artificial Intelligence for Nowcasting Pilot Project) Workshop
- Topic: Toward Effective and Realistic Satellite Video Prediction for Precipitation Nowcasting

**Seoul Hope University Career Scholarship** *2024*

- Merit-based scholarship ($2700) from Seoul Scholarship Foundation

**National Scholarship for Science and Engineering** *2023 - 2025*

- Merit-based scholarship from Korea Student Aid Foundation
- Full tuition support for 4 semesters

**Semester High Honors, Korea University** *Spring 2021 - Spring 2025*

- for 8 semesters

**President's Award, Korea University** *Fall 2021 - Fall 2022*

- for 3 semesters
- Academic excellence award given to a student with GPA 4.5/4.5 for two consecutive semesters

**Dean's Award, Korea University** *Spring 2021*

- Academic excellence award given to a student with GPA 4.5/4.5 for a semester

**14th KSCY Excellent Youth Scholars Award** *2019*

- in Computer Engineering Session
- Title: Epitope Prediction in Allergens Using PPI Prediction Model

## Skills

**Programming Languages:** Python (Advanced); C/C++ (Intermediate); OCaml, R, MATLAB (Experienced)

**Libraries & Frameworks:** PyTorch, PyTorch Geometric, Huggingface Transformers

**Languages:** Native in Korean, Conversational in English (TOEIC 960)

## Extracurricular Activities

**Taskforce for 2023 & 2024 InThon, Korea University** *2023 - 2024*

- Taskforce and competition question developer for the datathon track of InThon at the College of Informatics
- Topic in 2023: Korean Natural Language Generation (also served as taskforce leader)
- Topic in 2024: Reliable & Efficient Image Captioning with Vision-Language Models

**Co-founder of AIKU; AI in Korea University** *2022 - 2023*

- Co-founder of AI academic club for undergraduate students at Korea University
- Served as administrator and project leader

**President of Korea University Computer Science Academy** *2021 - 2024*

- Academic club for students at the College of Informatics, studying computer science
- Worked as an instructor for various studies (Linear Algebra, Probability and Statistics, Data Structures, Artificial Intelligence, Machine Learning & Deep Learning)

**Completed Yonsei University-Naver Cloud Data Science Education Course** *2021*

## Selected Courseworks

* indicates graduate-level courses.

**Computer Science & Artificial Intelligence**

Databases, Theory of Computation, Programming Language, Computer Architecture, Machine Learning, Deep Learning, Introduction to Computer Vision & Its Application, Advanced Machine Learning (Generative Models), Reinforcement Learning*, Bayesian Machine Learning*, Protein & Artificial Intelligence

**Mathematics & Statistics**

Analysis I/II, Complex Analysis I, Real Analysis, Topology I, Linear Algebra I/II, Algebra I, (Ordinary) Differential Equations, Differential Geometry I, Introduction to Convex Optimization, Probability & Statistics, Mathematical Statistics, Introduction to Bayesian Statistics