

Woocheol Shin

🌐 Personal Website | 📄 Google Scholar | ✉ woofe@kaist.ac.kr | 📞 +82-10-4340-2018

Research Interest

I am broadly interested in building generative policies for sequential decision-making toward human-desired goals in the real world. My current research focuses on steering large generative models, especially diffusion and flow-based models, toward desired outputs using reinforcement learning and reward-guided optimization.

Education

KAIST

M.S. Graduate School of Data Science

Feb. 2025 ~ Present

UNIST

B.S. Computer Science and Engineering

Feb. 2019 ~ Feb. 2025

Research Experience

- **System Intelligence Lab, KAIST** Oct. 2024 ~ Feb. 2025
Undergraduate Research Intern
Advisor : Prof. Jinkyoo Park(jinkyoo.park@kaist.ac.kr)
Focus : Generative model alignment, Diffusion/Flow models, Reinforcement learning
- **Data Mining Lab, UNIST** Dec. 2022 ~ Jun. 2024
Undergraduate Researcher, Seminar Organizer
Advisor : Prof. Junghoon Kim (junghoon.kim@unist.ac.kr)
Focus : Network stability, Cohesive subgraph discovery

Research Papers

*Equal contribution

- **Automated Kernel Discovery Towards Understanding High-dimensional Bayesian Optimization**
Taeyoung Yun*, Woocheol Shin*, Inhyuck Song, Jaewoo Lee, Jinkyoo Park
ICML 2026 WorkShop
- **Aligning Few-Step Generative Models by Amortizing Sample-based Variational Inference**
Jaewoo Lee*, Hyeongyu Kang*, Dohyun Kim, Kyuil Sim, Woocheol Shin, Minsu Kim, Taeyoung Yun, Jeongjae Lee, Sanghyeok Choi, Tabitha Edith Lee, Jongchul Ye, Jinkyoo Park
ICML 2026 WorkShop
- **Diffusion Fine-Tuning via Reparameterized Policy Gradient of the Soft Q-Function**
Hyeongyu Kang*, Jaewoo Lee*, Woocheol Shin*, Kiyoungh Om, Jinkyoo Park
ICLR 2026
- **Diffusion Alignment as Variational Expectation-Maximization**
Jaewoo Lee, Minsu Kim, Sanghyeok Choi, Inhyuck Song, Sujin Yun, Hyeongyu Kang, Woocheol Shin, Taeyoung Yun, Kiyoungh Om, Jinkyoo Park
ICLR 2026
- **Urban Traffic Network Layout Optimization with Guided Discrete Diffusion Models**
Taeyoung Yun, Inhyuck Song, Woocheol Shin, Yujin Shin, Sungpil Woo, Sunghwan Lim, Jinkyoo Park
WSDM 2026
- **Beyond Trivial Edges: A Fractional Approach to Cohesive Subgraph Detection in Hypergraphs**
Hyewon Kim, Woocheol Shin, Dahee Kim, Junghoon Kim, Sungsu Lim, Hyunji Jeong
Knowledge-Based Systems 2025

Scholarship

- **Master's Excellence Scholarship in Science & Engineering, Korea Student Aid Foundation** 2026
- **KAIST Scholarship, KAIST** Whole semesters
- **Academic Performance Scholarship, UNIST** Whole semesters

Awards and Achievements

- **ISE & GSDS Research Day Poster Competition, KAIST** Nov. 2025
Excellence Award
For the poster *Diffusion Finetuning via Reparameterized Policy Gradient of the Soft Q-function*
- **Dean's List, UNIST CSE** Sep. 2024
Awarded to top 4 students out of 224
- **Superior semester grades, UNIST**
Spring 2023 (4.3/4.3), Fall 2023 (4.24/4.3), Spring 2024 (4.3/4.3)

Patent

- **Data Analysis System and Method for Detecting Cohesive Subgraph in Hypergraphs** Korean Patent Application, Aug. 2025
- Application No. 10-2025-0107601
- Applicants: UNIST; Industry-Academic Cooperation Foundation, Kongju National University
- Inventors: Junghoon Kim, Hyewon Kim, Woocheol Shin, Dahee Kim, Hyunji Jeong

Teaching Experience

- **Teaching Assistant, KAIST** Sep. 2025 – Dec. 2025
- IE437: Data-Driven Decision Making and Control

Project

- **UIRP, UNIST** Mar. 2024 ~ May. 2024
UNIST Undergraduate Interdisciplinary Research Project
Topic : Generalised Anchoring Methods for Maximising User Engagement in Complex Social Networks
- **Creative Independent Project, UNIST AIGS** Oct. 2023 ~ May. 2024
Topic : A Budget Minimisation to Reinforcing Social Engagement
- **AICP, UNIST** Apr. 2023 ~ Dec. 2023
UNIST AI Challengers Program
Topic : Bipartite Cohesive Subgraph Discovery in Networks

Industrial Projects

- **Collaborative Project with ETRI** Feb. 2025 ~ Present
Topic : Reinforcement Learning-based Job Scheduling Policy Learning

Other Experiences

- **NAVER CONNECT 1784 School Revolution Program, NAVER** Dec. 2022 ~ Feb. 2023
Teaching AI, SW, and Autonomous Vehicles
- **ARAMCO Coding school, ARAMCO** Aug. 2022 ~ Nov. 2022
Teaching Programming, IOS app development
- **Education donation activities by university students, KOFAC** May. 2019 ~ Jul. 2019
Teaching Programming

References

- **Associate Professor, Jinkyoo Park**
Department of Industrial and Systems Engineering
Associate Professor (Adjunct), Graduate School of Data Science
Associate Professor (Adjunct), Graduate School of AI
KAIST
Email: jinkyoo.park@kaist.ac.kr
- **Assistant Professor, Junghoon Kim**
Computer Science and Engineering
UNIST
Email: junghoon.kim@unist.ac.kr