Seungsu Han

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Research Interests

Machine learning theory of reliable and robust inference: uncertainty quantification & statistical optimization.

Education

Seoul National University   *Mar 2020 – Present*
B.S. in Statistics   *(including 2-year mandatory military service)*

- Total GPA: 4.03/4.3
- Major GPA: 4.23/4.3

Relevant coursework:
Mathematical Statistics, Bayesian Statistics, Probability Theory, Stochastic Differential Equations, Computational Statistics, Data Science and Reinforcement Learning, Deep Learning: Statistical Perspective

Korea Science Academy of KAIST   *Mar 2017 - Feb 2020*
KAIST HP (auditing courses at KAIST) in the 6th semester

Publications

- **Han, S.**, Hwang, J., & Chang, W. (2025). Stick-Breaking Mixture Normalizing Flows with Component-Wise Tail Adaptation for Variational Inference. arXiv preprint arXiv:2510.07965. (under review)
- Oh, S., **Han, S.**, & Park, G. (2025, April). Optimal estimation of linear non-Gaussian structure equation models. In International Conference on Artificial Intelligence and Statistics (pp. 748-756). PMLR.

Experience

Research Intern @ Uncertainty Quantification Lab   *Dec 2024 – Present*
Advisor: Prof. Won Chang

- Proposed a flexible variational inference method with stick-breaking mixture normalizing flows
- Applied a tail transformation flow with a new tail estimator with a provable consistency and convergence guarantees

Research Intern @ Data Science & Machine Learning Lab   *Jun 2024 – Dec 2024*
Advisor: Prof. Gunwoong Park

- Proposed an structure learning algorithm with optimal sample complexity for learning Linear Non-Gaussian Acyclic Models (LiNGAMs)
- Conducted real-data analysis on the General Social Survey, identifying relationships among variables using DAG learning algorithms

Teaching Assistant   *Spring 2025, Fall 2025*
Liberal art Statistics (F32.102):

- Led review sessions and Q&A for fifteen first-year students taking Statistics course

Teaching Assistant   *Spring 2025*
Basic Computing – Exploring Data for the First Time (F37.101):

- Mentored first-year students in basic time-series and survival data analysis, hypothesis testing, and exploratory data analysis exercises

Projects

Conservative Offline Reinforcement Learning *Mar 2025 - Jun 2025*
Data Science and Reinforcement Learning (M3239.004100):

- Proposed *Probabilistic Conservative Q-learning* for offline RL, estimating behavior density with a conditional VAE and applying density-aware penalties to out-of-distribution actions
- Tools Used: Python(PyTorch, NumPy), Weights & Biases

Mountain Accident Prediction *Jun 2024 - Aug 2024*
Data Science & Machine Learning Lab with National Fire Agency

- Modeled mountain-rescue response times by station and proposed optimal dispatch siting to minimize time
- Tools Used: QGIS, Python, R

Talks & Posters

Talk — Stick-Breaking Mixture Normalizing Flows with Component- Wise Tail Adaptation for Variational Inference. *Nov 2025*
Fukuoka, Japan
Joint International Seminar with Kyushu University

Poster — Optimal estimation of linear non-Gaussian structure equation models *May 2025*
Artificial Intelligence and Statistics (AISTATS) 2025 *Phuket, Thailand*

Honors and Awards

- National Science & Technology Scholarship *Mar 2022 - Present*
- First Prize, Graduate Student Paper Presentation Award, The Korean Statistical Society Summer Conference *Jun 2025*
- Academic Excellence Scholarship Scholarship *Mar 2021 - Dec 2021*
- Dean's List *Fall 2020, Spring & Fall 2021*
- Canadian Intermediate Mathematics Contest Champion (1st place) *2016*

Extracurricular Activities

Bootcamp Teaching Assistant *Aug 2025*
Institute for Data Innovation in Science(IDIS), Seoul National University

- Led hands-on Python fundamentals sessions in a one-week R/Python introductory bootcamp for participants of the 61st public short course in statistics

Science Outreach Mentor *Winter & Summer 2022*
College of Natural Sciences, Seoul National University

- Volunteered as a mentor in two one-week science outreach programs designed to provide career exploration and hands-on natural science activities for elementary, middle, and high school students from underserved regions
- Tutored students during a five-day on-campus winter camp at Seoul National University and a five-day outreach camp in a rural area (Yeongdeok-gun, Korea)

Mentor, IVECA Global Virtual Summer Camp *Jul 2020*
Korea Science Academy of KAIST

- Mentored a student team in the mathematics track of a two-week intercultural online camp, collaborating with a partner high school in France

Member, SNU College of Natural Sciences Soccer Club *2021 - 2025*

Skills & Languages

Programming languages: **Python**, **R**, **Matlab**, **C**, **C++**, **Java**

Languages: **English**(Fluent), **Korean**(Native)