Kyusoon Kim

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Academic Appointments

Assistant Professor, Soongsil University (Abbr. SSU) — *Seoul, Korea*
Department of Statistics and Actuarial Science — Sep. 2025 - Current

Education

Seoul National University (Abbr. SNU) — *Seoul, Korea*
Ph.D. candidate, Statistics — Sep. 2020 - Aug. 2025
Dissertation title: Dimension Reduction and Feature Extraction of Graph-Valued Data
Advisor: Hee-Seok Oh

Seoul National University (SNU) — *Seoul, Korea*
B.S., Statistics — Mar. 2014 - Feb. 2020

Queen Mary University of London (QMUL) — *London, England*
Summer school student (Course: Practical Machine Learning) — Jul. 2019 - Aug. 2019

Gyeonggi Science High School (GSHS) — *Suwon, Korea*
Specialized high school for students talented in math and science — Mar. 2011 - Feb. 2014

Research and Professional Experience

Research Scientist — *Gangnam, Korea*
Sentience Inc. — Feb. 2020 - Jul. 2020

Participant of Undergraduate Research Internship Program — *Seoul National University*
Bayesian Statistics Lab. — Sep. 2019 - Feb. 2020
Advisor: Jaeyong Lee

Military Service — *Seongnam, Korea*
R.O.K Armed Forces (Sergeant) — Jul. 2017 - Apr. 2019

- Served in fulfillment of the mandatory military service duty for Republic of Korea citizens
- Created and improved auto-processing software for data processing using Python

Publications

Published Papers

[1] **Kim, K.**†, Park, S.†, Shin, H.-Y.†, Choi, J., Ha, J., Kim, J., Kwon, Y., Park, S. and Kang, S. (2026+). "Extremal PCA-based synthetic event generation for the inference of extreme precipitation," accepted for publication at ***Extremes***. [code]

[2] **Kim, K.** and Oh, H.-S. (2026+). "Graph canonical coherence analysis," ***The American Statistician***, published online. [paper] [code]

[3] Cho, H.†, **Kim, K.**† and Oh, H.-S. (2026+). "Statistical graph empirical mode decomposition by graph denoising and boundary treatment," ***Computational Statistics***, published online. [paper] [code]

[4] **Kim, K.*** (2026+). "Graph frequency-domain regression," ***Statistics***, published online. [paper] [code]

[5] **Kim, K.** and Oh, H.-S. (2026). "Graph frequency-domain factor modeling," ***IEEE Transactions on Pattern Analysis and Machine Intelligence***, 48(3), 3445-3457. [paper] [code]

[6] **Kim, K.** and Oh, H.-S. (2025). "Cross-spectral analysis of bivariate graph signals," ***IEEE Transactions on Pattern Analysis and Machine Intelligence***, 47(12), 11141-11151. [paper] [code]

[7] **Kim, K.** and Oh, H.-S. (2025). "Quantile-based fitting for graph signals," ***Statistics and Computing***, 35(6), 180. [paper] [code]

[8] Kang, S.†, **Kim, K.**†, Kwon, Y.†, Park, S.†, Park, S.†, Shin, H.-Y.†, Kim, J. and Oh, H.-S. (2025). "Semiparametric approaches for the inference of univariate and multivariate extremes," ***Extremes***, 28(1), 123-148. [paper] [code]

[9] **Kim, K.**†, Oh, S.†, Bae, K., and Oh, H.-S. (2025). "Prediction of wafer performance: Use of functional outlier detection and regression," ***IEEE Access***, 13, 35298-35308. [paper] [code]

[10] **Kim, K.** and Oh, H.-S. (2024). "Network time series forecasting using spectral graph wavelet transform," ***International Journal of Forecasting***, 40(3), 971-984. [paper] [code]

[11] **Kim, K.**, Oh, H.-S. and Park, M. (2023). "Principal component analysis for river network data: Use of spatiotemporal correlation and heterogeneous covariance structure," ***Environmetrics***, 34(4), e2753. [paper] [code]

Papers Under Review

[12] **Kim, K.** and Oh, H.-S. (2026+). "Principal component analysis in the graph frequency domain," under review. [arXiv] [code]

[13] Shin, H.-Y., **Kim, K.***, Lee, K. and Oh, H.-S. (2026+). "Absolute average and median treatment effects as causal estimands on metric spaces," under review. [arXiv] [code]

[14] Kim, S.† and **Kim, K.†*** (2026+). "Bayesian node-level outlier detection for graph signals," under review. [arXiv] [code]

[15] Kim, S. and **Kim, K.*** (2026+). "Bayesian generalized network autoregressive model with structured shrinkage and persistence priors," under review. [arXiv] [code]

*: corresponding author(s), †: equal contributions

Grants and Funding

Young Scientist Grants Type A (Basic Individual Research Grant) *NRF*
우수신진연구(유형A)
National Research Foundation of Korea (NRF) grant funded by the Korean government (MSIT) Mar. 2026 - Feb. 2029
- Research Project Title: Extended frameworks for graph-valued data analysis
- Role: Principal Investigator (PI)

Autonomous Core Research Institute Program Young Scientist Research (Basic Science Research Program) 자율운영 중점연구소(기초과학융합연구소) *NRF*
National Research Foundation of Korea (NRF) grant funded by the Ministry of Education Mar. 2026 - Feb. 2027
- Research Project Title: Dimensionality reduction for multivariate graph-indexed data with multiple datasets
- Role: Co-Investigator (Co-I)
- Integrative Institute of Basic Sciences (IIBS), Soongsil University

New Faculty Research Support (Soongsil University Research Fund) *Soongsil University*
Soongsil University Nov. 2025 - Oct. 2026
- Research Project Title: Statistical analysis of multivariate graph-valued data
- Role: Principal Investigator (PI)

Autonomous Core Research Institute Program Seed Research (Basic Science Research Program) 자율운영 중점연구소(기초과학융합연구소) *NRF*
National Research Foundation of Korea (NRF) grant funded by the Ministry of Education Sep. 2025 - Feb. 2026
- Research Project Title: Factor modeling for multivariate graph-valued data
- Role: Co-Investigator (Co-I)
- Integrative Institute of Basic Sciences (IIBS), Soongsil University

Research Subsidies for Ph.D. Candidates (Basic Science Research Program) *NRF*
박사과정생 연구장려금
National Research Foundation of Korea (NRF) grant funded by the Ministry of Education Sep. 2024 - Aug. 2025
- Research Project Title: Spectral analysis of graph-valued data
- Role: Principal Investigator (PI)

Awards and Honors

Scholarship for Next Generation Scholars in Fundamental Science *Seoul National University*
기초학문분야 학문후속세대
Seoul National University Mar. 2021 - Feb. 2022, Mar. 2024 - Aug. 2025

4th Prize in Extreme Value Analysis 2025 Data Competition *Extreme Value Analysis*
Extreme Value Analysis 2025 Jun. 2025
- Team name: SHSmultiscale
- Task: Prediction of extreme precipitation from a large ensemble of climate model runs

2025 KISS Outstanding Student Paper Awards *KISS*
Korean International Statistical Society (KISS) Jan. 2025

IMS 2024 ICSDS Student Travel Awards — *IMS ICSDS*
IMS International Conference on Statistics and Data Science (ICSDS) 2024 — Dec. 2024

Best Student Oral Presentation Award (1st Prize) — *Korean Statistical Society*
Korean Statistical Society Conference 2024 Winter — Nov. 2024

Best Student Oral Presentation Award (3rd Prize) — *Korean Statistical Society*
Korean Statistical Society Conference 2024 Summer — Jul. 2024

Outstanding Research Talent Fellowship 우수연구인재 펠로우십 — *Seoul National University*
BK21 FOUR (Brain Korea 21 Program for Leading Universities & Students) — Mar. 2022 - Aug. 2023

Best Student Oral Presentation Award (4th Prize) — *Korean Statistical Society*
Korean Statistical Society Conference 2023 Summer — Jul. 2023

2nd Prize in Extreme Value Analysis 2023 Data Competition — *Extreme Value Analysis*
Extreme Value Analysis 2023 — Jun. 2023

- Team name: SHSmultiscale
- Task: Prediction of extremal quantiles and joint probabilities of exceedance events

Best Student Oral Presentation Award (4th Prize) — *Korean Statistical Society*
Korean Statistical Society Conference 2022 Summer — Jul. 2022

Excellent Teaching Assistant Award 강의조교 우수활동 — *Seoul National University*
Faculty of Liberal Education — Feb. 2022

- Course Title: The World of Uncertainty and Statistics

Scholarship for Graduate Student Instructor 강의연구지원장학금 — *Seoul National University*
College of Natural Sciences — Sep. 2020 - Feb. 2021

The National Scholarship for Science and Engineering 국가우수장학금(이공계) — *Seoul National University*
Korea Student Aid Foundation — Mar. 2014 - Aug. 2017, Sep. 2019 - Feb. 2020

- All semesters during the undergraduate period

Top 30 teams in NAVER AI Vision Hackathon 2018 — *NAVER CONNECT ONE*
NAVER Corp. — Dec. 2018 - Feb. 2019

- Image retrieval challenge using a large dataset

Army Chief of Staff Award 국방부장관상 — *KT&G Sangsangmadang Chuncheon*
Ministry of Defense Start-up Challenge 2018 국방 창업경진대회 2018 — Jun. 2018 - Sep. 2018

- Developed a diary app for self-management by researching state-of-the-art NLP techniques including Deep Learning
- Advanced to K-Startup Challenge 2018

Dean' s list — *Seoul National University*
College of Natural Sciences — Jun. 2014 - Dec. 2017

- 2014 1st semester, 2014 2nd semester, 2015 1st semester, 2016 2nd semester, 2017 1st semester

Bronze medal in Collegiate Mathematics Competition — *Seoul National University*
Korean Mathematical Society — Nov. 2014

Silver medal in Korean Mathematics Olympiad — *Seoul National University*
Korean Mathematical Society — Aug. 2012

- Placed within the top 50 candidates for the International Mathematical Olympiad

Talks and Presentations

Ewha Womans University Department of Statistics Seminar — *Seoul, Korea*
Title: Graph-structured data: challenges, methods, and statistical perspectives (Invited Seminar) — Sep. 2026

Joint Statistical Meeting 2026 — *Boston, Massachusetts*
Title: Graph frequency-domain factor modeling (Oral Session) — Aug. 2026

New Researchers Conference 2026 — *Amherst, Massachusetts*
Title: Statistical methods for graph-structured data (Lightning Talk) — Jul. 2026

Korean Statistical Society Young Statistician's Meeting 2026 — *Seoul, Korea*
Title: Principal component analysis in the graph frequency domain (Oral Session) — Jul. 2026

Korean Statistical Society Conference 2026 Summer — *Gyeongju, Korea*
Title: Graph frequency-domain factor modeling (Oral Session / KSS-JSS-CSA Joint Session) — Jul. 2026

Korean Data & Information Science Society Conference 2025 Fall — *Daegu, Korea*
Title: Principal component analysis in the graph frequency domain (Oral Session) — Oct. 2025

Joint Statistical Meeting 2025 — *Nashville, Tennessee*
Title: Principal component analysis in the graph frequency domain (Oral Session / KISS Outstanding Student Paper Award) — Aug. 2025

IMS International Conference on Statistics and Data Science (ICSDS) 2024 — *Nice, France*
Title: Cross-spectral analysis of bivariate graph signals (Oral Session / Student Travel Award) — Dec. 2024

Korean Statistical Society Conference 2024 Winter — *Daejeon, Korea*
Title: Principal component analysis in the graph frequency domain (Oral Session) — Nov. 2024

Korean Statistical Society Conference 2024 Summer — *Seoul, Korea*
Title: Quantile-based fitting for graph signals (Oral Session) — Jul. 2024

Graph Signal Processing Workshop 2024 — *Delft, The Netherlands*
Title: Quantile-based fitting for graph signals (Oral Session) — Jun. 2024

Joint Statistical Meeting 2023 — *Toronto, Canada*
Title: Network time series forecasting using spectral graph wavelet transform (Oral Session) — Aug. 2023

Korean Statistical Society Conference 2023 Summer — *Busan, Korea*
Title: Absolute average and median treatment effects as causal estimands on metric spaces (Oral Session) — Jun. 2023

Data Science, Statistics & Visualisation 2022 Conference — *Tainan, Taiwan, ROC (Hybrid)*
Title: Principal component analysis for river network data: Use of spatiotemporal correlation and heterogeneous covariance structure (Oral Session) — Jun. 2022

Korean Statistical Society Conference 2022 Summer — *Seoul, Korea*
Title: Principal component analysis for river network data: Use of spatiotemporal correlation and heterogeneous covariance structure (Oral Session) — Jun. 2022

10th World Congress in Probability and Statistics — *Seoul, Korea (Virtual)*
Title: Geum River network data analysis via weighted PCA (Poster Session) — Jul. 2021

Teaching Experience

Teaching — *Soongsil University*

Multivariate Analysis (2150346901, taught in English) — Fall 2025, Fall 2026
Quality Control (2150212501) — Fall 2025, Fall 2026
Deep Learning Analysis (2150687701, 2150687702) — Spring 2026

Teaching Assistant — *Seoul National University*

Statistical Consulting and Practices (326.517A) — Spring 2022, Fall 2022, Spring 2025
The World of Uncertainty and Statistics (046.003) — Fall 2024
Theories of Statistics 1 (326.519A) — Spring 2024
Probability Concept and Applications (326.211) — Spring 2023
The World of Uncertainty and Statistics (046.003) — Fall 2021
Probability Concept and Applications (326.211) — Spring 2021
Statistical Computing and Lab. (326.212) — Fall 2020

Lab Instructor — *Statistical Research Inst., SNU*

Public lecture (Exploratory Data Analysis / Regression Analysis / Analysis of Variance) — Aug. 2022, Aug. 2024
Public lecture (Regression Analysis / Analysis of Variance) — Feb. 2023, Feb. 2024
Special lecture (Statistical Prediction) — Feb. 2022

Referee Service

Peer-Reviewed Journals

Computational Statistics
Journal of Statistical Computation and Simulation

Extremes
IEEE Transactions on Signal and Information Processing over Networks
International Journal of Forecasting

Technical Skills

Programming	R, Python, SAS, C, JAVA
Machine Learning Frameworks	Tensorflow, Keras, PyTorch
Typesetting	LaTeX, Beamer
Languages	Korean (Native), English (Intermediate)