Hanbyul Lee

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Research Interests

Spatial transcriptomics analysis, high-dimensional data analysis, matrix completion, convex and non-convex optimization, network analysis

Current Position

Postdoctoral Researcher — NY, USA

Computational and Systems Biology Program, Memorial Sloan Kettering Cancer Center — June. 2024 - Present

Supervisors: Dr. Kushal K. Dey (Memorial Sloan Kettering Cancer Center, Primary), Dr. Rahul Mazumder (MIT, Secondary)

Education and Past Positions

Visiting Assistant Professor — IN, USA

Department of Statistics, Purdue University — Jan. 2024 - May. 2024

PhD in Statistics — IN, USA

Purdue University — Aug. 2018 - Dec. 2023

Thesis: Graph-Based Analysis of Non-Random Missing Data Problems with Low-Rank Nature: Structured Prediction, Matrix Completion, and Sparse PCA
Advisors: Dr. Jean Honorio, Dr. Qifan Song

Assistant Data Analyst — Seoul, Korea

Bank of Korea — Mar. 2018 - May. 2018

MS in Statistics — Seoul, Korea

Seoul National University — Mar. 2016 - Feb. 2018

Thesis: Optimization Methods for SCAD-penalized Support Vector Machine
Advisor: Dr. Joong-Ho Won

BS in Statistics / BA in Media & Communication — Seoul, Korea

Seoul National University — Mar. 2011 - Feb. 2016

Publications

"Mapping disease critical spatially variable gene programs by integrating spatial transcriptomics with human genetics."
Hanbyul Lee*, Haochen Sun*, Xuewei Cao, Berke Karaahmet, Zhijian Li, Hans Ulrich-Klein, Mariko Taga, Gao Wang, Philip L. De Jager, David A. Bennett, Luca Pinello, Xin Jin, Rahul Mazumder, Kushal K. Dey.
BioRxiv, 2025

"Support Recovery in Sparse PCA with General Missing Data."
Hanbyul Lee, Qifan Song, Jean Honorio.
Uncertainty in Artificial Intelligence (UAI), 2024.

"Support Recovery in Sparse PCA with Incomplete Data."

Hanbyul Lee, Qifan Song, Jean Honorio.
Advances in Neural Information Processing Systems (NeurIPS), 2022.

"On the Fundamental Limits of Exact Inference in Structured Prediction."
Hanbyul Lee, Kevin Bello, Jean Honorio.
IEEE International Symposium on Information Theory (ISIT), 2022.

"Ensemble of Deep Convolutional Neural Networks for Prognosis of Ischemic Stroke."
Youngwon Choi, Yongchan Kwon, Hanbyul Lee, Beom Joon Kim, Myunghee Cho Paik, and Joong-Ho Won.
International Workshop on Brainlesion: Glioma, Multiple Sclerosis, Stroke and Traumatic Brain Injuries, 2017.

Honors and Awards

CIGP-Lynn Fellowship, Purdue Graduate School, 2018-2019

First place, **Ischemic Stroke Lesion Segmentation (ISLES) Challenge**, 19th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2016

National Scholarship for Science and Engineering, Korea Student Aid Foundation, 2011-2013

Presentations

"Multi-scale spatial gene variability shapes development, degeneration, and disease."
September 19th, 2025, Cell Symposia: Precision genomics in human health, Oral Presentation

"Characterizing the Disease Informativeness Using Spatially Variable Genes."
May 5th, 2025, The 3rd FunGen-AD xQTL Symposium, Oral Presentation

"Support Recovery in Sparse PCA with General Missing Data."
July 18th, 2024, Uncertainty in Artificial Intelligence (UAI), Oral Presentation

"Support Recovery in Sparse PCA with Incomplete Data."
November 30th, 2022, Advances in Neural Information Processing Systems (NeurIPS), Poster Presentation

"On the Fundamental Limits of Exact Inference in Structured Prediction."
July 1st, 2022, IEEE International Symposium on Information Theory (ISIT), Oral Presentation

Teaching Experiences

STAT 301 - *Elementary Statistical Methods*, Purdue Univerisity

Lecturer	Spring 2024
Exam Writer	Fall 2022 - Fall 2023
Lab TA	Fall 2019 - Spring 2022

STAT 519 - *Introduction to Probability Theory*, Purdue Univerisity

Grader	Fall 2019

TECHNICAL SKILLS	**Fluent** `R, Python, MATLAB` **Moderate** `C`
ACADEMIC SERVICE	Journal Reviewer - JMRL, 2025 Conference Reviewer - NeurIPS 2023, ICML 2023