

Junyoung Park

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RESEARCH INTERESTS

I am generally interested in data analysis with unique geometric structures necessitating rigorous treatment. Much of my research focuses on compositional data analysis, including variable selection, dimension reduction, and predictive model development. I am also interested in the recent theory of kernel methods, notably conditional mean embeddings and sufficient dimension reduction.

EDUCATION

Ph.D. Candidate in Mathematical Sciences Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea (Co)Advisors: Cheolwoo Park, Jeongyoun Ahn	2018–2024
B.S. in Mathematics Korea University, Seoul, Korea	2013–2018

EXPERIENCE

Research Assistant in Statistical Learning Under the supervision of Prof. Cheolwoo Park and Jeongyoun Ahn – Kernel methods, compositional data, dimensionality reduction, autoencoder clustering	KAIST 2021–2024
Research Assistant in Algebraic Geometry Under the supervision of Prof. Sijong Kwak – Projective geometry, syzygies, applied algebraic geometry – Extensive training in geometry, algebra, and analysis at the graduate level and beyond	KAIST 2018–2021
Max Planck Institute for Mathematics in the Sciences Visiting research student – Attended Summer School on Randomness and Learning in Non-Linear Algebra	Leipzig, Germany Summer 2019
University Financial Engineering Association (U.FE.A) Team leader – Led Master’s-level financial engineering & mathematics studies – Studied stochastic modeling and hedge (pricing) theory of various equity, interest rate derivatives	Seoul, Korea 2016–2017

AWARDS AND SCHOLARSHIPS

- **Presentation Award for Graduate Students**, 2nd place, Korean Statistical Society (KSS) 2022
- **The Outstanding Teaching Assistant Award**, Calculus II, KAIST Fall, 2020
- **University Students Contest of Mathematics**, Silver Awards, Korean Mathematical Society (KMS) 2016, 2017
- **Presidential Science Undergraduate Fellowship**, fully funded for 8 semesters 2013–2018
- **The Korean Mathematical Olympiad (KMO)** 2nd round of middle school division, Gold Awards 2009

PUBLICATIONS

1. **Park, J.**, Ahn, J., and Park, C. (2023), Kernel Sufficient Dimension Reduction and Variable Selection for Compositional Data via Amalgamation, *Proceedings of the 40th International Conference on Machine Learning (ICML)*, [link](#).
2. Kang, I., Choi, H., Yoon, Y.-J., **Park, J.**, Kwon, S.-S., and Park, C. (2023), Frechet Distance-Based Cluster Analysis for Multi-Dimensional Functional Data, *Statistics and Computing*, 33(4), 75.
3. **Park, J.**, Yoon, C., Park, C., and Ahn, J. (2022), Kernel Methods for Radial Transformed Compositional Data with Many Zeros, *Proceedings of the 39th International Conference on Machine Learning (ICML)*, 162: 17458 - 17472, [link](#).

In progress:

1. Interpretable Composition-To-Composition Dimension Reduction via Conditional Covariance Operator (with Jeongyoun Ahn and Cheolwoo Park), to appear as a chapter in my Ph.D. dissertation.

TALKS

- **2023 Winter Conference, the Korean Statistical Society** (upcoming) 2023
Sungshin Women's University, Seoul, Korea
– Title: Interpretable composition-to-composition dimension reduction via conditional covariance operator
- **40th International Conference on Machine Learning (ICML)** (poster) 2023
Honolulu, HI, USA
– Title: Kernel sufficient dimension reduction and variable selection for compositional data
– Presented also at 2023 Summer Conference, the Korean Statistical Society, Busan, Korea
- **2022 Fall KAIST Math Graduate student Seminar** 2022
KAIST, Daejeon, Korea
– Title: Kernel methods for radial transformed compositional data with many zeros
- **39th International Conference on Machine Learning (ICML)** (spotlight talk) 2022
Baltimore, MD, USA
– Title: Kernel methods for radial transformed compositional data with many zeros
– Presented also at 2022 Summer Conference, the Korean Statistical Society, Seoul, Korea

TEACHING

- **Teaching Assistant** at KAIST (selected list)
 - Statistical Data Science Practice (DS516) Spring 2023
 - Probability and Statistics (MAS250) Fall 2021
 - Abstract Algebra I (MAS311) Spring 2021
 - Mathematical Statistics (MAS355) Fall 2019
 - Matrix Group Theory (MAS435) Spring 2019
 - Gave a guest lecture on connectedness of Lie groups in English
 - Abstract Algebra II (MAS312) Fall 2018
 - Gave several lectures throughout the semester

COMPUTING SKILLS

- Python (for machine learning, statistics), R (for statistics), previous experiences with Matlab and C.
- Acceleration of optimization: experience in leveraging **TensorFlow AutoGraph** in my research.
- Parallel programming in R: **foreach** package, **mclapply** function in Linux environment.

LANGUAGES

- Korean (native)
- English

HOBBIES

- Singing, better with playing guitar.
- Running, hiking, and climbing.

REFERENCES

Cheolwoo Park

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