

Junyoung Park

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RESEARCH INTERESTS

I am generally interested in data analysis with unique geometric structures necessitating rigorous treatment. My recent research focuses on **compositional data analysis**, including variable selection, dimension reduction, and predictive model development. On the theoretical side, I am interested in kernel conditional mean embeddings, sufficient dimension reduction, and high-dimensional statistics.

EDUCATION

Ph.D. in Mathematical Sciences KAIST, Daejeon, Korea Thesis: Kernel Methods for Compositional Data and Dimensionality Reduction (Co)Advisors: Cheolwoo Park, Jeongyoun Ahn	03/2018 - 02/2024
B.S. in Mathematics Korea University, Seoul, Korea	03/2013 - 02/2018

PROFESSIONAL POSITIONS

Postdoctoral Research Fellow Department of Biostatistics, University of Michigan, MI, USA Supervisor: Irina Gaynanova Projects on continuous glucose monitoring (CGM) data	09/2024 -
BK21 Postdoctoral Research Fellow Natural Science Research Institute, KAIST, Daejeon, Korea Supervisor: Cheolwoo Park Funded by the BK21 project in Korea	03/2024 - 08/2024

EXPERIENCE

Research Assistant in Statistical Learning Under the supervision of Prof. Cheolwoo Park and Jeongyoun Ahn – Kernel methods, compositional data, dimension reduction, autoencoder clustering	KAIST 08/2021 - 02/2024
Technical Research Personnel For military duty	KAIST 03/2020 - 02/2023
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 09/2018 - 07/2021
Max Planck Institute for Mathematics in the Sciences Visiting research student, invited by Prof. Mateusz Michalek – 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
- Stochastic modeling and hedge (pricing) theory of various equity, interest rate derivatives

Seoul, Korea

03/2016 - 08/2017

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, In *International Conference on Machine Learning (ICML)*, pp. 27034-27047, PMLR ([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, In *International Conference on Machine Learning (ICML)*, pp. 17458-17472, PMLR ([link](#)).

In progress:

1. Interpretable Dimension Reduction for Compositional Data (with Jeongyoun Ahn and Cheolwoo Park), partially appeared in my Ph.D. dissertation.

TALKS

- **2024 Joint Statistical Meetings** 08/2024
Oregon Convention Center, Portland, OR, USA
– Title: Interpretable dimension reduction for compositional data
- **2023 Winter Conference, the Korean Statistical Society** 12/2023
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) 07/2023
Honolulu, HI, USA
– Title: Kernel sufficient dimension reduction and variable selection for compositional data via Amalgamation
- **2023 Summer Conference, the Korean Statistical Society** 06/2023
Pukyong National University, Busan, Korea
– Title: Kernel sufficient dimension reduction and variable selection for compositional data via Amalgamation
- **2022 Fall KAIST Math Graduate student Seminar** 10/2022
KAIST, Daejeon, Korea
– Title: Kernel methods for radial transformed compositional data with many zeros
- **39th International Conference on Machine Learning (ICML)** (spotlight talk) 06/2022
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 (awarded, 2nd place)

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

ACADEMIC SERVICES

- **Journal Refereeing**
 - Biometrics
 - WIREs Computational Statistics

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 (experience in Linux environment)

LANGUAGES

- Korean (native)
- English

HOBBIES

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

REFERENCES

Cheolwoo Park

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Jeongyoun Ahn

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Sijong Kwak (former advisor in mathematics)

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