Wookyeong Song

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Research Interests

Object Data Analysis (Interpretable statistical models for complex data in metric spaces), **Metric Geometry** (Intrinsic structure of random objects, manifold learning), **Applied Statistics** (Causal Inference, brain networks, distributional data with optimal transport, and point cloud data), **ML / AI** (Geometry-aware generative models, transfer learning, uncertainty quantification).

Education

Ph.D. Candidate in Statistics, University of California, Davis *Davis, CA*

Advisor: Professor Hans-Georg Müller *Jun 2026 (Expected)*

- Recipient of Julius Blum Award, highest Ph.D. academic award in the department.
- Recipient of Peter G. Hall Award, highest Ph.D. research award in the department.

B.S. in Statistics and Mathematical Sciences (Double Major), Seoul National University *Seoul, South Korea*

Advisor: Professor Hee-Seok Oh & Professor Taesung Park *Feb 2021*

- Grade: Summa cum laude.

Publications and Preprints

Choi, C.†, **Song, W.**†, Müller, H.-G., and Park, B. U. (2025), Additive Fréchet Regression of Random Objects, *Submitted*, †co-first author.

Song, W. and Müller, H.-G. (2025), ADOPT: Additive Optimal Transport Regression, *Submitted*.

Song, W.†, Zhou, H.†, Zhou, Y.† and Müller, H.-G. (2025), Non-Euclidean Data Analysis With Metric Statistics, *Harvard Data Science Review*, *Minor Revision*.

Song, W. and Müller, H.-G. (2025), Inference for Dispersion and Curvature of Random Objects, *Journal of the American Statistical Association: Theory and Methods*, *Accepted*, **(selected as Student Paper Award Finalist by ASA Nonparametric Statistics Section, JSM 2024)**.

Song, W., Lim, Y., Cheung, K. and Oh, H.-S. (2023), Multi-feature Clustering of Step Data Using Multivariate Functional Principal Component Analysis, *Statistical Papers*, 65(4), 2109-2134.

Kim, H.†, **Song, W.**† et al. (2023), Development, Validation, and Comparison of a Nomogram Based on Radiologic Findings for Predicting Malignancy in Intraductal Papillary Mucinous Neoplasms of the Pancreas ... , *Journal of Hepato-Biliary-Pancreatic Science*s, 30(1), 133-143.

Kang, J., Lee, C., **Song, W.** et al. (2020), Risk Prediction for Malignant Intraductal Papillary Mucinous Neoplasm of the Pancreas: Logistic Regression vs Machine Learning, *Scientific Reports*, 10, 20140.

Work in Progress

Song, W., Dubey, P., Petersen, A. and Müller, H.-G. (2025), Inference for Fréchet Regression Effect and its Application to Variable Selection.

Cui, M., **Song, W.**, and Müller, H.-G. (2025), Fréchet Variance Process.

Song, W. and Müller, H.-G. (2025), Intrinsic Geodesic Learning in Metric Ambient Spaces.

Song, W. and Müller, H.-G. (2025), Variance Decomposition of Object-valued Regression in Metric Spaces.

Honors and Awards

2025	**Peter G. Hall Award,** Department of Statistics, UC Davis	*Davis, CA*
2024	**Best Presentation Award,** Special Topic-contributed Session by ASA Nonparametric Statistics Section, JSM 2024	*Portland, OR*
2024	**Student Paper Award Finalist,** ASA Nonparametric Statistics Section, JSM 2024	*Portland, OR*
2023	**Travel Award,** Princeton Machine Learning Theory Summer School, Princeton University	*Princeton, NJ*
2022	**Julius Blum Award,** Department of Statistics, UC Davis	*Davis, CA*
2020	**Excellent Tutoring Award (Mathematical Statistics 1),** Seoul National University	*Seoul, South Korea*
2014,15,20	**Dean's List,** College of Natural Science, Seoul National University	*Seoul, South Korea*
2019	**3rd Prize,** Poster presentation, Fall Korean Statistical Society Conference	*Seoul, South Korea*

Conference, Workshop, and Program Participation

JSM 2024, Topic-contributed Paper Session, Portland, OR, USA, 2024

Statistics in the Age of AI, Poster Session, George Washington University, DC, USA, 2024

Princeton Machine Learning Theory Summer School, Princeton University, Princeton, NJ, USA, 2023

Fall Korean Statistical Society Conference, Poster Session, University of Seoul, South Korea, 2019

Services

Reviewer Journal of the American Statistical Association, Biometrika, AISTATS 2026

Teaching Experience

Associate Instructor *Davis, CA*

University of California, Davis *Summer 2025*

- STA103: Applied Statistics for Business and Economics (Rating: 4.75/5.0)

Teaching Assistant *Davis, CA*

University of California, Davis

- STA010: Statistical Thinking (Fall 2021, Spring 2022)
- STA142A: Statistical Learning I (Winter 2022)
- STA141B: Data & Web Technologies for Data Analysis (Fall 2022)
- STA206: Statistical Methods for Research I (Fall 2022)
- STA100: Applied Statistics for Biological Science (Winter 2023)
- STA013: Elementary Statistics (Spring 2023)
- STA103: Applied Statistics for Business and Economics (Spring 2025)
- STA104: Nonparametric Statistics (Fall 2025)

Mentoring

Muqing Cui (now Ph.D. student at UC Davis) *2023 - Present*

- Project: Fréchet Variance Process

Professional Experience

Data Science Ph.D. Intern *Plano, TX*

Capital One *Summer 2024*

- Developed explainable AI (XAI) models to estimate risk of account-level auto loans, ensuring transparency and optimized performance.

Research Assistant *Seoul, South Korea*

Multiscale Methods in Statistics Lab, Seoul National University *Mar 2019 - Feb 2021*

- Proposed a robust clustering framework for daily step count data from wearable devices with over 80% of values being zero.

Research Assistant *Seoul, South Korea*

Bioinformatics and Biostatistics Lab, Seoul National University *Mar 2019 - Dec 2020*

- Built multi-omics hazard model for pancreatic cancer, incorporating gene expressions, somatic mutations, and clinical data points.

Sergeant *Jeju, South Korea*

Republic of Korea Army *Feb 2016 - Nov 2017*

- Worked as auxiliary police in Korean National Police Agency

Software

frechet Statistical Analysis for Random Objects and Non-Euclidean Data (R package on **GitHub**).

References

Hans-Georg Müller *hgmueller@ucdavis.edu*

- Distinguished Professor, Department of Statistics, University of California, Davis

Jane-Ling Wang *janelwang@ucdavis.edu*

- Distinguished Professor, Department of Statistics, University of California, Davis

Mina Karzand *mkarzand@ucdavis.edu*

- Assistant Professor, Department of Statistics, University of California, Davis