

Kazuma Sawaya

Ph.D. Candidate in Statistics

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Homepage

GitHub · Google Scholar

Research Profile

Ph.D. candidate in statistics, advised by Professor Masaaki Imaizumi. My research develops rigorous methods for valid inference in high-dimensional and nonlinear models, with a current emphasis on uncertainty quantification and the mathematical foundations of modern machine learning.

High-dimensional statistics

Uncertainty quantification

Modern machine learning theory

Education

Ph.D. in Economics (Statistics)

The University of Tokyo

Apr 2024 - Mar 2027

Advisor: M. Imaizumi

M.A. in Economics

The University of Tokyo

Apr 2022 - Mar 2024

Advisor: M. Imaizumi

B.A. in Economics

Tohoku University

Apr 2018 - Mar 2022

Advisor: Y. Uematsu

Publications

P1 High-Dimensional Single-Index Models: Link Estimation and Marginal Inference

JOURNAL

K. Sawaya, Y. Uematsu, and M. Imaizumi

Information and Inference: A Journal of the IMA, 15(3):iaag032, 2026. [link](#) · [arXiv](#) · [code](#)

In brief. Estimates the unknown link in proportional high-dimensional single-index models and uses it to construct efficient estimators with coordinate-wise valid confidence intervals and p-values.

P2 Moment-Based Adjustments of Statistical Inference in High-Dimensional Generalized Linear Models

JOURNAL

K. Sawaya, Y. Uematsu, and M. Imaizumi

Electronic Journal of Statistics, 20(2):4083–4133, 2026. [link](#) · [arXiv](#)

In brief. Develops a feasible, moment-based correction for high-dimensional GLM inference, yielding confidence intervals with asymptotically exact coverage when parameter dimension and sample size are large and comparable.

P3 Provable FDR Control for Deep Feature Selection: Deep MLPs and Beyond

AISTATS 2026

K. Sawaya

In *Proceedings of the 29th International Conference on Artificial Intelligence and Statistics (AISTATS)*, PMLR 300:4951–4959, 2026. [link](#) · [arXiv](#) · [code](#)

In brief. Establishes marginal Gaussian approximations for gradient-based feature importance and asymptotic FDR control across broadly structured deep neural networks trained by stochastic gradient descent.

Work in Progress

W1 Precise Asymptotics for Linear Rank Regression

WORK IN
PROGRESS

K. Sawaya, Y. Uematsu, and M. Imaizumi
Manuscript in preparation.

In brief. Develops precise asymptotics for tuning-free robust regression in the proportional limit. The loss function is non-separable, but its proximal operator is characterized as the isotonic regression.

W2 High-Dimensional Gaussian Approximation via Group Structure

WORK IN
PROGRESS

K. Sawaya
Manuscript in preparation.

In brief. Uses orthogonal equivariance of M-estimators and gradient-based algorithms to derive Gaussian approximations in high dimensions under flexible teacher-student settings including modern deep neural networks.

Fellowships and Research Funding

ACT-X, “Innovations in Mathematical and Information Sciences for Building Next-generation AI”

Oct 2024 - Mar 2027

Japan Science and Technology Agency (JST)

JPY 4.3 million

JSPS Research Fellowship for Young Scientists (DC1)

Apr 2024 - Mar 2027

Japan Society for the Promotion of Science (JSPS)

JPY 2.4 million

World-leading Innovative Graduate Study for Frontiers of Mathematical Sciences and Physics

Oct 2022 - Mar 2027

The University of Tokyo

Honors and Awards

- Jan 2026 Best Presentation Award** Kansai Econometrics Meeting; ranked 1st of 11 presentations.
- Nov 2025 Excellent Student Presentation Award Finalist** IBIS 2025; 10 finalists among 258 presentations.
- Sep 2025 ISI Tokyo Memorial Encouragement Award** Japan Statistical Society.
- Sep 2023 Best Presentation Award** Japanese Joint Statistical Meeting 2023; ranked 1st of 26 presentations.
- Jan 2023 Excellent Presentation Award** Kansai Econometrics Meeting; 2 awardees among 8 presentations.
- Mar 2022 Excellent Student Presentation Award** 16th Japan Statistical Society Spring Meeting; 5 awardees among 34 presentations.
- Mar 2022 Japan Statistical Society Certificate Director’s Award** 16th Japan Statistical Society Spring Meeting.

Presentations and Research Visits

A complete, regularly updated presentation list is also available at sawaya-ka.github.io/talks.

International

- Jul 2026** **IMS Annual Meeting 2026**, Salzburg, Austria; invited oral presentation.
- Jun-Jul 2026** **University of Regensburg**, Regensburg, Germany; one-week research visit and seminar hosted by Merle Behr.
- Jun 2026** **ICTP-IndAM-SLMATH Summer Graduate School for Machine Learning**, Trieste, Italy; poster presentation.
- May 2026** **29th International Conference on Artificial Intelligence and Statistics**, Tangier, Morocco; poster presentation.
- Mar 2026** **Workshop on Functional Inference and Machine Intelligence**, Tokyo, Japan; poster presentation.
- Dec 2025** **IMS International Conference on Statistics and Data Science**, Seville, Spain; poster presentation.
- Oct 2025** **65th ISI World Statistics Congress**, The Hague, Netherlands; poster presentation.
- Mar 2025** **OIST Machine Learning Workshop**, Okinawa, Japan; poster presentation.
- Mar 2024** **Workshop on Functional Inference and Machine Intelligence**, Bristol, United Kingdom; poster presentation.
- Aug 2023** **Econometrics and Statistics**, Tokyo, Japan; oral presentation.
- May 2023** **Youth in High-Dimensions**, Trieste, Italy; poster presentation.

Japan

- Sep 2026** **Japanese Joint Statistical Meeting 2026**, Yokohama City University; forthcoming.
- Aug 2026** **Statistics Summer Seminar 2026**, Aichi.
2nd Workshop on Interdisciplinary Statistical Analysis Using Computational Techniques, Institute of Statistical Mathematics.
- Feb 2026** **Using Computational Techniques**, Institute of Statistical Mathematics.
- Jan 2026** **Kansai Econometrics Meeting**, Miyazaki Municipal University.
- Nov 2025** **28th Workshop on Information-Based Induction Sciences (IBIS 2025)**, Naha.
- Sep 2025** **Young Researchers' Association for Machine Learning (YAML 2025)**, Atami.
- Sep 2025** **Japanese Joint Statistical Meeting 2025**, Kansai University.
- Aug 2025** **Statistics Summer Seminar 2025**, Kagawa.
- Nov 2024** **27th Workshop on Information-Based Induction Sciences (IBIS 2024)**, Omiya.
- Sep 2024** **Japanese Joint Statistical Meeting 2024**, Tokyo University of Science.
- Aug 2024** **Statistics Summer Seminar 2024**, Niigata.
- Sep 2023** **Japanese Joint Statistical Meeting 2023**, Kyoto University.
- Aug 2023** **Statistics Summer Seminar 2023**, Fukui.
- Jan 2023** **Kansai Econometrics Meeting**, Osaka University.
- Sep 2022** **Japanese Joint Statistical Meeting 2022**, Seikei University.
- Aug 2022** **Statistics Summer Seminar 2022**, Miyazaki.
- Mar 2022** **16th Japan Statistical Society Spring Meeting**, Keio University.

References

Masaaki Imaizumi

Ph.D. Advisor

Associate Professor, Komaba Institute for Science, The University of Tokyo
Team Director, RIKEN Center for Advanced Intelligence Project
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Yoshimasa Uematsu

Research Collaborator

Associate Professor, Department of Social Data Science, Hitotsubashi University
Visiting Associate Professor, Tohoku University
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