

# Kei Ishikawa

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## Education

### ETH Zurich, Switzerland

September 2020 – November 2022

Master of Science in Statistics (Distinction)

GPA: 5.93/6, Overall GPA: 5.58/6 (incl. non-mandatory courses)

### Tokyo Institute of Technology, Japan

April 2020 – March 2024 (expected)<sup>1</sup>

Master of Science, Mathematical and Computing Science

GPA: 4.06/4.5, Currently pursuing the degree while working full-time.

### ETH Zurich, Switzerland

September 2018 – August 2019

Exchange Program, Department of Computer Science

GPA: 5.55/6

### University of Tokyo, Japan

April 2015 – March 2020

Bachelor of Engineering in Systems Innovation (Dean's Award)

GPA: 3.72/4

## Work Experience

### Machine Learning Engineer, G-Research, London, UK

November 2022 -

Mainly using Pytorch and PyData stack. The details cannot be disclosed due to confidentiality.

### Intern (Quant Analyst), G-Research, London, UK

June 2021 - September 2021

PoC of a new algorithm for risk modeling of a financial market. Mainly used Pyspark, Pandas, Pytorch, Numpy, and Scipy.

### Intern, Preferred Networks Co., Ltd., Tokyo, Japan

August 2020 - September 2020

I worked on open-source software for hyperparameter optimization (**Optuna**) in Python. I improved the performance of its core optimization algorithm, as introduced in this blog post: [here](#).

## Publications, Preprints, and Other R&D Experience

### Kernel Conditional Moment Constraints for Confounding Robust Inference<sup>2</sup>

*Published at AISTATS 2023*

In my master's thesis, I developed a causally-robust policy evaluation (e.g. treatment effect estimation) method for offline contextual bandits that strictly generalizes the existing methods.

### Efficient Debiased Evidence Estimation by Multilevel Monte Carlo Sampling<sup>2</sup>

*Published at UAI 2021 (Oral presentation)*

In my bachelor's thesis, I developed a fast algorithm for debiased Bayesian computation using a technique called the multilevel Monte Carlo method.

### A Convex Framework for Confounding Robust Inference<sup>2</sup>

*Preprint, 2023*

An extension of the above AISTATS paper, which introduces a more general convergence analysis, asymptotic normality, and model selection with information criterion.

### On the Parallel Complexity of Multilevel Monte Carlo in Stochastic Gradient Descent<sup>2</sup>

<sup>1</sup>Took a leave of absence while at ETH Zurich for two years.

<sup>2</sup>Contributed as the first author.

*Preprint, 2023*

I developed a novel method for integrating the multilevel Monte Carlo method into the stochastic gradient descent that better utilizes the multilevel structure than the conventional approach.

### **Contributions to Open Source Software (OSS)**

I occasionally contribute to OSS, such as scikit-learn (#19732), Scipy (#13654), and Optuna (#1762, #2423, and #4591).

## **Competencies**

<b>Languages</b>	Japanese (Native), English (IELTS: 7.5), Chinese (Elementary)
<b>Programming</b>	Advanced: Python, Pytorch, Jax, R Intermediate: SQL, UNIX Elementary: C, C++
<b>Coursework</b>	Applied Mathematics: Mathematical Optimization, Discrete Mathematics, Algorithms and Data Structures, Convex Optimization, Numerical Analysis Statistics: Mathematical Statistics, Time Series Analysis, Causal Inference Machine Learning: Reinforcement Learning, Probabilistic machine learning, Natural Language Processing, Computer Vision Computer Systems: Computer Architecture, Operating Systems, Computer Networks, Relational Databases, Compiler, High-performance Computing Miscellaneous: Signal Processing, Microeconomics, Game Theory, Optimal Control

## **Awards and Funding**

### **Heiwa Nakajima Foundation**

Scholarship for the master's study at ETH Zurich. 45K USD.

### **Dean's Award (Faculty of Engineering, University of Tokyo)**

Awarded for academic excellence. About 20/1000 graduating students receive this award.

### **Tobitate Young Ambassador Program**

Scholarship for the exchange study at ETH Zurich. 18K USD.