

# Shuhei Watanabe

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## Education

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- Oct 2020 – Oct 2023    **University of Freiburg**, Freiburg, Germany.  
MSc in Computer Science. Supervisor: Prof. Frank Hutter.  
Overall GPA: 1.1/5.0 (1.0 is the best grade).
- Apr 2014 – Mar 2020    **The University of Tokyo**, Tokyo, Japan.  
BSc in Systems Innovation (Sep 2015 ~), Liberal arts (~ Aug 2015).  
Graduated with **the Best GPA** out of 37 students.

## Employment

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- Jun 2024 – Present    **National Institute of Advanced Industrial Science and Technology (AIST)**, Tokyo, Japan. (Part Time Visiting Researcher at Social Intelligence Research (SIR) Team)  
Mentored Chisa Mori & Kaichi Irie (see below for more details).
- Oct 2023 – Dec 2025    **Preferred Networks Inc.**, Tokyo, Japan. (Full Time Research Engineer)  
Core Optuna developer. Delivered significant speedup of TPESampler (300x), the default sampler in Optuna, and GPSampler (10x faster than BoTorch). Led the development of GPSampler and its extensions. Worked on revenue applications of Optuna for materials & physics simulations. (summarized achievements)
- Dec 2020 – Sep 2023    **Machine Learning Lab**, Freiburg, Germany.  
Development of Auto-PyTorch, an AutoML tool.
- Sep 2018 – Sep 2020    **AIST**, Tokyo, Japan. (Full Time Technical Staff at SIR Team)  
Co-first authored “Warm Starting CMA-ES for Hyperparameter Optimization” (AAAI’21). Conducted a large-scale experiment on a cluster.

## Selected Awards / Honors

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- **AutoML 2023 Travel Awards** (500 EUR)
- **IJCAI-AIJ 2023 Travel and Accessibility Grant Program** (1,000 USD).
- **ELIZA MSc Scholarship** (12,000 EUR, 4 students in the University of Freiburg).
- **Deutschlandstipendium** (3,600 EUR).
- **ITO Foundation for International Education Exchange** (48,000 USD, AR: 6.7%).
- **Hatakeyama Award from the Japan Society of Mechanical Engineers** (top 1.5% ( $\approx 5/340$ ) grades in the mechanical-related faculties at the University of Tokyo).
- **PRMU 2018 Yearly Research Encouragement Award** for “*Speed Up of Hyper-Parameter Tuning with Nelder-Mead Method by Parallel Computing*”. (AR:  $3/170=1.8\%$ )

## Selected Publications

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See [my website](#) for the full publication list. The total citation count is **1000+** as of October 2025 on Google Scholar. The acceptance rate of IJCAI’23 was about 14%.

1. **S. Watanabe**, F. Hutter (2023). c-TPE: Tree-Structured Parzen Estimator with Inequality Constraints for Expensive Hyperparameter Optimization. International Joint Conference on Artificial Intelligence (IJCAI).
2. **S. Watanabe**, N. Awad, M. Onishi, F. Hutter (2023). Speeding Up Multi-Objective Hyperparameter Optimization by Task Similarity-Based Meta-Learning for the Tree-Structured Parzen Estimator. International Joint Conference on Artificial Intelligence (IJCAI).
3. **S. Watanabe**, A. Bansal, F. Hutter (2023). PED-ANOVA: Efficiently Quantifying Hyperparameter Importance in Arbitrary Subspaces. International Joint Conference on Artificial Intelligence (IJCAI). (**The default algorithm in Optuna Dashboard**)
4. **S. Watanabe** (2023). Tree-Structured Parzen Estimator: Understanding Its Algorithm Components and Their Roles for Better Empirical Performance. arXiv:2304.11127. (**400+ citations on Google Scholar**)

## Mentoring & Supervision

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Jun 2024 – Present	<b>Chisa Mori</b> , MSc Student, AIST. Theme: Parallel coordinate plots for multi-objective problems.
Jul 2024 – Present	<b>Kaito Baba</b> , MSc Student, Preferred Networks Inc. Theme: Development of constrained optimization for the Gaussian process-based sampler (single-objective, multi-objective).
Aug 2025 – Present	<b>Kaichi Irie</b> , MSc Student, Preferred Networks Inc. & AIST. Theme: Development of parallel processing in the Gaussian process-based sampler (article).

## Technical Highlights

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- Cluster Experience (MPI, parallel programming, large-scale experiments, MOAB, Slurm)
- Physics-Based Simulation (lattice Boltzmann, numerical integration, constraint satisfaction)
- Machine Learning Understanding (deep learning, reinforcement learning)
- Software Engineering (Python, C++, PyTorch, team development)
- Strong Mathematical Background (statistics incl. measure theory, optimization)
- Applications of Bayesian Optimization (materials science & Sim2Real gap)
- Hands-on Experience (transformers with pretraining, generative teaching networks, DQN and imitation learning using OpenAI Gym)

## Miscellaneous

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- **Japanese** (Native Language), **English** (C1, TOEFL iBT: 100), **German** (B2)
- Approx. Top 3.5% (highest) algorithm programmer in **AtCoder** mostly using C++.