Shuhei Watanabe

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Education

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

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

- **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% (≃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

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**, the first detailed paper about the Optuna default sampler)

Mentoring & Supervision

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

Technical Highlights

- 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

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