

Atsuki Sato

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Research Interests

Algorithms and data structures, especially those leveraging machine-learned predictions; database systems, with a focus on index data structures; learned indexes; algorithmic robustness; theoretical analysis of machine-learning-based systems.

Education

The University of Tokyo, Tokyo, Japan Apr. 2025 – Present
Ph.D. Student, Graduate School of Information Science and Technology
The University of Tokyo, Tokyo, Japan Apr. 2023 – Mar. 2025
M.S. in Information and Communication Engineering
The University of Tokyo, Tokyo, Japan Apr. 2019 – Mar. 2023
B.S. in Information and Communication Engineering

Selected Publications

- **Atsuki Sato**, Martin Aumüller, and Yusuke Matsui. Mathematical Foundations of Poisoning Attacks on Linear Regression over Cumulative Distribution Functions. *SIGMOD*, 2026.
- **Atsuki Sato** and Yusuke Matsui. PCF Learned Sort: a Learning-Augmented Sort Algorithm with $O(n \log \log n)$ Expected Complexity. *TMLR*, 2025. Featured Certification.
- **Atsuki Sato** and Yusuke Matsui. Fast Partitioned Learned Bloom Filter. *NeurIPS*, 2023. Poster.
- Kyosuke Nishishita, **Atsuki Sato**, and Yusuke Matsui. Optimized Learned Count-Min Sketch. *MLSys Workshop at NeurIPS*, 2025.
- Goki Muramoto, **Atsuki Sato**, and Takayoshi Koyama. Media of Langue: Exploring Word Translation Network. *Findings of NAACL*, 2025.

Research Experience

Matsui Lab, The University of Tokyo Tokyo, Japan
Researcher / Ph.D. Student Apr. 2023 – Present

- Research on learning-augmented data structures and algorithms, with emphasis on efficiency and provable guarantees.
- **Faster algorithms:** Sped up the dynamic programming for learned Bloom filter construction by exploiting structural properties (e.g., Monge), achieving up to a $761\times$ speedup (Sato & Matsui, NeurIPS 2023).
- **Complexity analysis:** Introduced the first learned sort with expected $\mathcal{O}(n \log \log n)$ time (Sato & Matsui, TMLR 2025).
- **Mathematical foundations and international collaboration:** Characterized optimal attacks on learned indexes, and designed an efficient algorithm for instance-dependent upper bounds (Sato, Aumüller, & Matsui, SIGMOD 2026).

Industry Experience

estie, Inc.: *Software Engineer Intern, automation for real estate workflows using LLMs* Tokyo, Japan, Jan. 2025
Fixstars Corporation: *Software Engineer Intern, evaluation of quantized CV models on Jetson* Tokyo, Japan, Jul. 2024
Recruit Co., Ltd.: *Data Specialist Intern, improved matching infrastructure and reduced cost* Tokyo, Japan, Nov. 2023
GMO Inc.: *Software Engineer Intern, analysis and improvement of ad selection models* Tokyo, Japan, Sep. 2023
teamLab Inc.: *Software Engineer Intern, frontend development for a queueing analysis app* Tokyo, Japan, Feb. 2022

Awards and Honors

- TMLR Featured Certification.
- Department Chair’s Award for Master’s Thesis, The University of Tokyo.
- Best Performance Award, Statistics Certificate Grade 1, Applied Statistics, 2023.
- Excellent Bachelor’s Thesis Award, The University of Tokyo, 2023.

Software and Skills

- **Software:**
 - Fast Partitioned Learned Bloom Filter, github.com/atsukisato/FastPLBF (NeurIPS 2023).
 - PCF Learned Sort, github.com/atsukisato/PCF_Learned_Sort (TMLR 2025).
- **Programming:** C++, Python, and frontend (web) development.