
ABOUT ME

Software engineer and researcher working on Quantum Computing and AI security. Experienced in developing full-stack applications, optimizing machine learning models and quantum computing algorithms. Background in containerization, and automation for AI-driven applications in Python and Rust. Passionate about bridging research and software development to create efficient, secure, and innovative solutions.

EDUCATION

Institute of Science Tokyo (Former Tokyo Institute of Technology) *Sept. 2023-Present*
Ph.D. in Information and Communication Engineering (*Super Smart Society Incentive*)

The High Energy Accelerator Research Organization (KEK) *Oct. 2020-Sept. 2023*
M.Sc. in Experimental High Energy Physics (*Monbukagakusho Honors*)

University of California, San Diego *June 2016-Mar. 2020*
B.Sc. in Physics (*Provost Honors*)

TECHNICAL SKILLS

Programming: Python, C++, Rust, Typescript, Kotlin, Julia
Packages or Libraries: PyTorch, Pennylane, Qiskit, Scikit-learn, Flask, React, GEANT4
Dev Tools: Docker, Grafana, MongoDB, Portainer, PostgreSQL
Languages: English (Professional), Japanese (Business Intermediate), Mandarin (Native)

EXPERIENCE

Research Associate | RIKEN Advanced Intelligence Project *Apr. 2024-Present*
Developed methods for defending and attacking large language and vision-language models under Prof. Jun Sakuma. Conducted theoretical research on AI security and privacy.

Software Engineer Intern | ExaWizards Inc. *Aug. 2025-Dec. 2025*
Developed a BtoB web application for enterprise HR skill training using React and Kotlin. Implemented database migration and data flow design to enhance system efficiency and user experience.

Junior Physicist | Inner Tracking Detector Group (ATLAS Exp., CERN) *Apr. 2021-Sept. 2023*
Analyzed Higgs self-coupling physics ($HH \rightarrow bb\tau\tau$) using machine learning techniques. Collaborated with CERN on detector testing and data interpretation.

Lab Assistant | Popmintchev Lab, UCSD *July 2018-Mar. 2020*
Designed optical systems for high harmonic generation. Simulated intensity profiles of laser beams using Matlab for ionized gases (Ar^+ , He^+ , Ne^+).

PROJECTS

ParametricDFT.jl: A Julia Package for Finding the Sparse Basis in Image Compression *Dec. 2025-*
A Julia package for learning parametric quantum Fourier transforms using manifold optimization. This package implements a variational approach to approximate the Discrete Fourier Transform (DFT) using parameterized quantum circuits. lib
Tools: Julia, Manopt.jl, Manifolds.jl, Docker

LogosQ: Quantum Computing Library in Rust *July. 2025-Present*
Developed a quantum computing library in Rust, implementing quantum gates, circuits, and simulation algorithms from scratch. Optimized the gate with direct gate manipulation and Tensor Contractions, lead to publication and submission to IEEE Transaction on Quantum Engineering. lib doc.
Tools: Cargo, Rust, Docker, Typescript

DIA: Human Resource Technology for Enterprises Skills Training *August. 2025- Dec. 2025*
A BtoB product that leverages AI to provide personalized training and development programs for employees. Meanwhile, it offers analytics and insights to organizations for workforce optimization and automatic skill gap identification, and generate the tickets distributed to Hiring website like Indeed, Glassdoor, and LinkedIn.
Tools: React, Javalin, PostgreSQL, Docker, Kotlin, TypeScript, Postman

Data Extraction and Model Alignment *Nov. 2024-Apr. 2025*
Developed scalable data extraction attack algorithms for large language models, improving attack methodologies for membership inference and model alignment. Built end-to-end data pipelines, integrating reinforcement learning to

optimize model robustness. Designed monitoring and visualization dashboards with Grafana.

Tools: Grafana, PyTorch, Llama2/3, GPT-2 XL, Docker

Graph Encoding System with Quantum Computing

Sept. 2023-Nov. 2024

Developed a variational quantum circuit for tensor-based graph encoding. Deployed API interfaces for quantum computation workflows. Published research findings on ArXiv and accepted by IEEE conference.

Tools: PennyLane, Qiskit, Python, C++

Data Analysis for Higgs Boson Research

Jan. 2022-Sept. 2023

Engineered a machine learning pipeline to analyze high-dimensional image data from the ATLAS pixel detector. Developed custom neural networks (CNNs, GNNs) for feature extraction to enhance detections for 15 ~ 20%. Implemented automated data preprocessing workflows for large-scale datasets.

Tools: Python, TensorFlow, PyTorch, MySQL

PUBLICATIONS

LogosQ: A High-Performance and Type-Safe Quantum Computing Library in Rust

IEEE Transactions on Quantum Engineering (Under Review), Techrxiv., 2025.

Tensor-Based Binary Graph Encoding for Variational Quantum Classifiers

2025 IEEE Quantum Computing and Network Communication, Nara, Japan, arXiv:2501.14185, 2025.

URL: <https://arxiv.org/abs/2501.14185>

Search for Nearly Mass-Degenerate Higgsinos Using Low-Momentum Mildly Displaced Tracks in pp Collisions at $\sqrt{s} = 13$ TeV with the ATLAS Detector

Physical Review Letters, Vol. 132, No. 22, American Physical Society (APS), 2024.

DOI: [10.1103/PhysRevLett.132.221801](https://doi.org/10.1103/PhysRevLett.132.221801)

Overnight Stock Movement Prediction with Contextualized Embedding Incorporating News and Stock

2022 IEEE 11th Global Conference on Consumer Electronics (GCCE), Pages 476-478, 2022.

DOI: [10.1109/GCCE56475.2022.10014070](https://doi.org/10.1109/GCCE56475.2022.10014070)

AWARDS AND HONORS

Science Tokyo Spring Scholarship

2025.12-Now

Program for development of next-generation front runners with comprehensive knowledge and humanity.

TSUBAME Scholarship

2025.10-12

Awarded to outstanding Ph.D. students at Institute of Science Tokyo for excellence in academic achievements.

Super Smart Society Research Incentive

2024.4-Now

Research in fundamental technologies for a Super Smart Society at Tokyo Institute of Technology.

JASSO Monbukagakusho Honors Scholarship

2021-2022

Prestigious Japanese government scholarship for graduate studies at KEK, recognizing academic excellence.

Provost Honors

2016-2020

Consistently placed on the Provost's Honor List at UCSD for high academic performance during undergraduate studies.

ADDITIONAL ACTIVITIES

- Board Game Arena, Catan Global Top 50. + Scythe, Brass Birmingham.
- PADI Advanced Open Water Diver (Licensed 2018).
- GO, Amateur 2 Dan.

Contribute to multiple open source projects on GitHub, including PennyLane v0.40.0