

EDUCATION

Nanyang Technological University

2026 – Present

Bachelor of Computing, Computer Science (Honours)

Turing AI Scholars Programme and NTU Honours College

NUS High School of Math and Science

2018 – 2023

Majors in Math, Physics, Biology, Chemistry with Honours in Physics

GPA: 4.5/5.0 (High Distinction) APs: Physics C (E&M), Physics C (Mech), Stats: 5

EXPERIENCE

Backend Developer, Data Analyst, ExCo

2024 – Present

Singapore Biology League

Skills: TypeScript, Matplotlib, Pandas, Numpy, GCP, Firebase, Cloudflare, Vercel

Web-app based real-time contest open to all high school students; 1.2k participants in 2024, 2.2k+ in 2026

- Spearheaded end-to-end lifecycle of contest's backend functionality integrating Firestore API from scratch; no unintended behaviour over 5M+ log events across GCP Logging and Vercel, within a four-hour contest period
- Designed and deployed globally synchronized Kahoot-style gameshow segment, with fail-safe state management
- Optimized with respect to Firestore database ops, GCP Cloud Functions throughput and latency, bringing total backend cost to <\$20 and p50/p99 to <30/100ms with sub-millisecond CPU time for all submission requests
- Analysed user behaviour across 150k+ logged submissions and 2k feedback form responses using statistical methods, item-response models (e.g. Rasch) and LLM-based sentiment NLP; compared relative performance across teams and problems for evaluation of contest rules and problem difficulty, providing data-driven insights for ExCo
- Designed statistical tests detecting cross-team collusion in submissions, validated via permutation-calibrated nulls, false-discovery-rate control and blinded review; led to disqualification of teams to preserve competition fairness

AI Research and Engineering Intern

Jun 2023 – Nov 2023, Nov 2025 – Jul 2026

Invigilo AI Skills: Computer Vision, Linux, C++, OpenCV, PyTorch, FastAPI, CUDA/NVMM, Nvidia Metropolis, Docker, vLLM

Real-time video analytics to detect unsafe conditions in construction and manufacturing workplaces

- Architected eight asynchronous, stateful pipeline components at multiple cadences (time-based, frame-based) robust to intermittencies in object detections and pipeline restarts, reducing repeat alarm rate by 90%
- Evaluated existing literature and performed research & development into task-specific adaptation of SOTA CV models, raised recall from 60% to ~80% in a specific contextually nuanced task
- Self-hosted VLMs over a range of VRAM, compute constraints and quantization levels totalling ~20 permutations, evaluated qualitatively and quantitatively for contextual perception of safety hazards using Nvidia Metropolis tooling
- Engineered asynchronous, thread-safe buffered optical flow extension to existing C++ pipeline interfacing with NvOF, attaining 90%+ F1 for classification of machinery into moving vs stationary on consumer desktop hardware

Software Engineering Intern

Nov 2023 – Dec 2023

Fabrica AI

Skills: Test-Driven Development, Linux, C++, Python, ROS2

Design and fabrication of tile grouting robot, with extensive testing framework for predictable behaviour

- Implemented manual and automated unit and integration tests for movement direction and PID tuning of robot arm
- Researched and implemented liveness tests for sensors and motors for Layer 2/5/6/7 (Linux USB devices, ROS2 pub/sub, sensor payload validity)

PROJECTS

Numerical Methods for Computation of Particles in Fusion Hot Spots (Research)

2022 – 2023

Skills: Academic Writing, Numerical Simulation, OpenCL, OpenMP, C++

- Optimized OpenCL GPU kernels for an iterative solver of Maxwell's equations, improving stability via smaller timesteps
- Poster presentation at 50 Years of Physics in Singapore: A Symposium in Celebration of Professor K K Phua Feb 2023
- Oral presentation (virtual) at International Conference on Plasma Science and Applications (ICPSA) 2022 Dec 2022

Advent of Codspeed 2024 (github: samt41/aoc2024)

Dec 2024

Skills: SIMD, Rust

- Employed SIMD techniques in Rust to optimize wall-clock time over both input parsing and algorithms

SKILLS & AWARDS

Technical Skills: Computer Vision, Deep Learning, Software Engineering, Academic Writing, Numerical Simulation

Tools: C++, Python, Java, TypeScript, Node.js, Rust, Git, Linux, GCP, Cloudflare, ROS, OpenCL, OpenMP, CUDA, Nvidia Metropolis, OpenCV, PyTorch, Matplotlib, Pandas, Numpy

Australian Informatics Olympiad – Silver

2020

Singapore Mathematics Olympiad (Junior) – Silver

2019

Singapore Physics League – Silver

2023