

# TEJAS GARREPALLY

+65 9737 9146 | [gtejas@u.nus.edu](mailto:gtejas@u.nus.edu) | [linkedin.com/in/gtejas](https://www.linkedin.com/in/gtejas) | [github.com/g-tejas](https://github.com/g-tejas)

## EDUCATION

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### National University of Singapore

Bachelor of Computing - Computer Science; Current GPA: 4.76/5.0

Singapore

Expected Graduation: April 2025

## EXPERIENCE

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### Vilota - C++ Software Engineer Intern

May 2023 – August 2023

- Developed a calibration and diagnostics tool for camera calibration using C++20 with throughput and performance optimizations, increasing calibration pipeline speed by 60% ([github.com/vilota-dev/calibration\\_tool](https://github.com/vilota-dev/calibration_tool))
- Implemented zero-copy UDP multicast publishing within robotics messaging system for camera drivers on embedded systems, reducing end-to-end hot path latency by 30%
- Built a Python-based visualization toolkit to provide insights into calibration accuracy, distortion effects and FOV visualisation for fish-eye cameras, aiding computer vision research

### NUS iQF - Quantitative Developer

August 2022 – May 2023

- Led a team of 5 people on a research project on the VPIN metric as a leading indicator of liquidity-induced volatility and a new form of probability of informed trading
- Implemented the 'Flow toxicity in High-Frequency World' paper and applied the VPIN microstructure model to cryptocurrency markets ([github.com/g-tejas/toxic-flow](https://github.com/g-tejas/toxic-flow))
- Performed parametric analysis and optimization using Monte-carlo backtesting, reducing false positive rate and increasing short-term volatility prediction accuracy

### Nested Technologies - Quant Developer Intern

March 2022 – July 2022

- Worked on profitable stock selection strategy with ensemble machine learning methods which outperformed the market's risk-adjusted returns over the past decade
- Reduced noise-to-signal ratio through PCA and unsupervised ML methods, minimising annualised variance and max draw-down by 20%

## PROJECTS

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### Enigma | [github.com/g-tejas/enigma-rs](https://github.com/g-tejas/enigma-rs)

- A high performance, multi-threaded, lock-free HFT microstructure and trade monitoring GUI built in pure Rust
- Implemented lock-free data structures to handle high-throughput tick data, minimizing network latency, lock contention and overhead
- Designed and built a latency-free GUI by utilizing Tokio Tungstenite, delegating non-blocking web-socket tokio streams (L2 tick data) to worker threads, communicating via MPMC asynchronous, infinitely buffered channels (Fork-join model)

### C++20 io\_uring Event Loop Framework | [github.com/g-tejas/zephyr](https://github.com/g-tejas/zephyr)

- A high performance io\_uring backed coroutine executor and asynchronous IO framework built with io\_uring and C++20 stackless coroutines, modeled after the "Proactor Design Pattern" inspired by Boost.Asio's architecture
- Leverages io\_uring for true asynchronous Linux system calls, to minimize buffer allocation costs and reduce context switches, and enabling zero copy IO
- Benchmarked to have 30% higher requests per second than the epoll equivalent, with 0.6% CPU overhead

## OTHER ACHIEVEMENTS

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**Hack & Roll Award Winner:** out of 400 participants - 2023

**NUS SoC Venture Initiation Grant:** Won \$10,000 in grant money - 2023

**Stephen Riady Young Entrepreneur Scholarship:** Awarded to less than 1% of undergraduates - 2023

## TECHNICAL SKILLS

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**Languages:** C++, Python, Rust, Java, Javascript

**Frameworks & Libraries:** Pandas, Boost.Asio, NumPy, Tokio, ImGui, gRPC, Cap'n Proto, VueJS

**Developer Tools:** CMake, Git, Docker, CircleCI