Tejus Singh

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Education

University of California, San Diego Expected Dec 2026
Masters of Science in Computer Science | GPA: 4.00

University of California, Irvine Sep 2022 - Jun 2025
Bachelors of Science in Applied Physics, Minor in Mathematics | GPA: 3.80

Relevant Courses: LLM theory & reasoning, Algorithms (DSA), Embedded systems, OS, Signal processing, Particle physics, Time series modeling, Quantitative finance & derivatives, Linear & abstract algebra

Technical Skills

Languages and Tools: Python, Julia, C/C++, Java, SQL, TensorFlow, Pytorch, JAX, Git, Pandas, Vitis HLS, CUDA
Skills: Probabilistic and online machine learning, Predictive modeling, Quantitative trading, Portfolio management, Computational medical imaging, Software development, Embedded systems software

Experience

Kastner Lab | *Graduate Researcher* - La Jolla, CA Nov 2025 - April 2026

- Implementing **quantized transformer architecture** for **sub-microsecond inference** on AMD Versal FPGA
- Compressing a full transformer (8 Layer/8 Heads) into a hardware-compatible (4 layer/4 head) model, through architecture simplification and retraining in **C++** and **Python**, without degrading accuracy (0.86 in validation)
- Working with CERN and Fermilab on **particle classification** for real-time physics inference

Evovest | *Quantitative Research Intern* - Montréal, Canada Mar 2024 - Jun 2025

- Researched, produced asset returns prediction models using **Bayesian regime-switching Kalman filters, variational autoencoding, physics-informed loss** functions**,** and **neural stochastic differential equations.**
- Outperformed Gradient Boosted Trees (**XGBOOST**) and flavors of VAR and (S)ARIMA models
- Built **trust-aware prediction systems** by fusing ML model outputs with past and incoming market signals using **bayesian uncertainty** to stabilize performance during high-volatility regimes
- Owned full project development from **research to production**, handling large tabular data and streaming pipelines

Molloi Imaging Physics Lab | *Undergraduate Researcher* - Irvine, CA Jan 2023 - June 2025

- Published voxel-wise deep-learning pipelines for medical imaging, 3D CT segmentation, and material decomposition.
- Implemented **physics-based constraints with neural networks** to improve learning and generalization
- Ran large scale 3D simulations and experiments on patient data to benchmark model performance
- Researched **CNNs, UNets, and autoencoders** in **Julia and Python**, leveraging **CUDA for acceleration**

Publications

D. Black, T. Singh, S. Molloi. ***Coronary artery calcium quantification using dual energy material decomposition: A simulation study***. Int. J. Cardiovascular Imaging, vol. 40, no. 7, 1465–1474, 2024
https://doi.org/10.1007/s10554-024-03124-9

Projects

Time Series Forecasting via Transformers

- Forecasting volatile signals via the **inverted transformer**. **Feature engineering** and extracting low-dimension structures via unsupervised methods (**manifold learning,** autoencoding**, wavelet analysis**)
- Building **AI Agent** pipeline to aggregate and automate analysis of non-numerical, multi-modal data

Nitrogen Vacancy Centers - https://drive.google.com/file/d/1KdeWQuoe9psiV-UMVnv5jwJUMmcqf9Zb/view

- Studied spin-based qubit systems, connected physical spin dynamics to computational primitives, and manipulated electron spin states to access various quantum states

Creative Problem Solving in Mathematics - https://drive.google.com/file/d/1FyG6ULg18AhrNRF8esVFyAor-grDAFjK/view

- Compilation of the ways to prove ideas mathematically. Written with inspiration from Polya's "How to solve it," under guidance of mathematician Jaaziel Lopez de la Luz

Robotic Balancing via Control Algorithms

- CAD designed, 3D printed, and programmed an arduino platform robot to balance and move a ball to an arbitrary position