

Jayanth S. Tummala

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EDUCATION

Yale University

Expected May 2029

B.S. in Electrical Engineering and Computer Science, Cert. in Quantum Science | **3.94/4.00**

- Relevant Courses: Computer Systems (Fall '26), Electronics, Data Structures, Linear Algebra, Discrete Math
- Activities: Club Triathlon, Yale Outdoors (Event Coordinator), First-Year Outdoor Orientation Trip Leader

Glastonbury High School

June 2025

- Class Scholar (top 2% GPA), Crew Captain, CyberPatriot State Winner, SciOly State Medalist, Eagle Scout

EXPERIENCE

Computational Genomics Researcher

Feb. 2026 – Present

Yale School of Medicine | Hoon Cho Lab

Awarded Yale College First-Year Research Fellowship

- Built **Python** algorithm scoring 93K-node assembly graphs by k-mer fingerprints to isolate 2–4 target-gene nodes; automated in **Bash/SLURM** on HPC
- Chose 21-mer over 15-mer fingerprinting to fix pseudogene contamination; 100% match to ground-truth benchmark
- Designing differentially private Bloom filter k-mer index, to query cross-institutionally without exposing raw reads
- Pre-filtered reads by k-mer match, discarding 99.98% of input to shrink output graph 4.6× with no coverage loss

CubeSat Software Engineer

Sep. 2026 – Present

Yale Undergraduate Aerospace Association

- Developing flight software for Yale's first CubeSat, a NASA-selected 2U satellite carrying a cosmic ray detector

Software Engineer, MajorAudit

Sep. 2026 – Present

Yale Computer Society

- Building a full-stack **React/Django** web app that helps Yale students plan and track their major requirements

Computational Biology Student Researcher

Dec. 2023 – Mar. 2025

University of Connecticut | Advised by Derek Aguiar, Asst. Professor of CS

- Analyzed RNA structure prediction accuracy based on nanopore translocation times in deep learning models

PROJECTS

GPU Matrix Multiplication (SGEMM) Optimization | CUDA, C++

July 2026 – Aug. 2026

- Built 8 staged **CUDA C++** SGEMM kernels, each removing one hardware bottleneck; reached 79% of cuBLAS
- Traced limit to shared-memory loads per FMA; 2-D thread tile raised FMAs per load from <1 to 4 (1.8× gain)
- Kept an uncoalesced kernel as a control (one index swapped) to measure access-pattern cost directly: 3.6× slower

3D Software Rasterizer | C++

Aug. 2026 – Oct. 2026

- Built a CPU-only rasterizer from scratch, reimplementing the pipeline stages of OpenGL/DirectX
- Used fixed-point edge functions with a top-left fill rule so shared edges draw exactly once; verified in 39 unit tests
- Added clipping, z-buffering, and perspective-correct texturing; renders a 69K-triangle mesh in 5 ms/frame

2D Roguelike Game Engine | Java, Swing/Java2D

Apr. 2023 – June 2023

- Built a real-time combat engine on a custom multithreaded game loop holding constant FPS under full entity load
- Implemented BFS pathfinding AI, hitbox collision, and a class hierarchy sharing core logic across all entities

TECHNICAL SKILLS

Languages: C++, CUDA, C, Python (NumPy, SciPy), Java, MATLAB

Tools & Concepts: Linux/Unix, Bash/Shell Scripting, SLURM, Git, OOP

TECHNICAL LEADERSHIP

Organizer | *YHack, Yale's Intercollegiate Hackathon*

Sep. 2026 – Present

Technician | *Yale Student Technology Collaborative*

Sep. 2025 – Sep. 2026

Instructor | *The Coder School* – taught Python, Java, Lua, and Scratch to ages 6–13

June 2024 – Apr. 2025