Ayushmaan Puri

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Education

University of California, San Diego0000 — Expected August 2026
B.S. CSE: Computer Engineering — *GPA 3.50/4.0*

Orange Coast College — Aug 2022 - May 2024
A.S. for Transfer: Computer Science, Mathematics, and Physics — *Graduated with Honors*

Research Experience

Undergraduate Researcher | Junkyard Autograder — April 2026 – Present
Kastner Research Group – UC San Diego — *La Jolla, CA*

- Investigating repurposing discarded smartphones as a dedicated autograding cluster to replace oversubscribed GPU pods shared across a class of 330 students.
- Deployed a 40-node k3s Kubernetes cluster on ARM64 Google Pixel Fold devices running Debian over USB Ethernet; configured each node as an isolated Linux execution environment for containerized grading jobs.
- Modeled real submission timing and runtime distributions from 8 programming assignments using Gaussian Mixture Models with BIC-selected component counts.
- Built a synthetic workload generator sampling from fitted GMMs to stress test cluster throughput and determine the minimum phone count needed to serve a class without queuing delays.

Undergraduate Researcher | UnifiedSplitting — June 2025 – March 2026
PatLab & UC Scholars Research Program – UC San Diego — *La Jolla, CA*

- Built heterogeneous CPU-GPU pipelines for efficient CNN inference on unified memory architectures.
- Implemented model-splitting strategies for parallel CPU-GPU inference on NVIDIA Jetson devices.
- Profiled per-layer CPU-to-GPU speedup ratios across full network architectures, identifying a 10x gap between convolutional layers (300–500x) and fully connected layers (30–40x) that informed the optimal splitting point.
- Validated the approach across five architectures (ResNet-18/50, MobileNetV2, EfficientNet-B2, ViT-Tiny) and six simulated edge hardware profiles, achieving 8–24% throughput gains over GPU-only baselines.
- Wrote and presented a methods paper at UCSD Summer Research Conference 2025 and Southern California Conference for Undergraduate Research 2025. Recognized nationally by the CRA for outstanding research.

Summer Research Intern | Active Thermography for Defect Detection — June 2024 – Sep. 2024
SeNSE – Indian Institute of Technology, Delhi — *New Delhi, India*

- Developed a per-pixel signal processing pipeline in Python (OpenCV, NumPy, SciPy) to detect subsurface defects in Carbon and Glass Fibre-Reinforced Polymer (CFRP/GFRP) composites using active thermography.
- Implemented linear detrending, full temporal cross-correlation against a sound reference pixel, main lobe extraction, and FFT phase computation across three experimental datasets (LFM, Active Pulsed, and Flux excitation).
- Demonstrated that the FFT phase of the correlation main lobe produces qualitatively distinct signatures for defective vs. healthy material regions, establishing a new discriminating observable for non-destructive evaluation. Recorded results and findings in a research paper.

Summer Research Intern | Lunar Rover Modeling — June 2023 – Aug. 2023
NASA California Space Grant Consortium — *Costa Mesa, CA*

- Designed and built a model lunar lava tube exploration rover using a rocker-bogie chassis, solar-powered with lithium-polymer battery storage.
- Developed Arduino firmware integrating UV, Hall effect magnetic, and gravimeter sensors to detect water-ice signatures, iron-rich rock, and subsurface density anomalies.
- Implemented on-board SD card data logging for sensor telemetry and an object avoidance drive system for autonomous navigation over loose regolith.

Publications and Talks

SCCUR: Southern California Conference for Undergraduate Research — Nov. 2025

- Oral presentation on UnifiedSplitting at CSU Channel Islands with Fahad Alkhazam and Parth Mehta. [Slides] [Abstract]

UC San Diego Summer Research Conference (SRC 2025) — Aug. 2025

- Presented pipeline optimizations for CPU–GPU split inference on edge devices. Results reproduced across Jetson platforms. [Paper] [Abstract]

Awards and Honors

CRA Outstanding Undergraduate Researcher Honorable Mention | *Computing Research Association* Jan. 2026

UC Scholar | *UC San Diego* May 2025

George Ciarlo Memorial Scholarship | *Orange Coast College* Apr. 2024

Teaching, Mentorship, and Leadership

STEM Peer Mentor Aug. 2023 – May 2024

OCC STEM Academy / MESA Program *Costa Mesa, CA*

- Mentored and tutored 17 first-generation STEM students, providing weekly one-on-one guidance, email check-ins, and long-term academic planning support.
- Organized and led workshops on career development, internships, and transfer preparation, increasing student awareness of opportunities beyond community college.
- Co-managed daily operations of the STEM/MESA Center with 6 peer mentors, coordinating tutoring schedules, student outreach, and resource distribution.

Club President Aug. 2023 – May 2024

OCC STEM Club *Costa Mesa, CA*

- Hosted weekly workshops and projects for 20+ members across all STEM disciplines, fostering an inclusive community for students to explore diverse scientific interests.
- Organized volunteering missions to foster interest in STEM fields among children. Led a group of 10 volunteers to teach young students about physics and biology at OCC's annual science night.

Volunteer Teaching Assistant July 2023 – Feb. 2024

Microsoft TEALS Program *Houston, TX (Remote)*

- Co-taught CS Discoveries curriculum twice weekly to a class of 26 middle school students, integrating lessons on programming logic and problem-solving.
- Collaborated with teachers to adapt instruction for a hybrid learning environment, ensuring equitable participation in both in-person and virtual settings.
- Designed a sustainable CS education framework for Santa Fe Junior High, enabling the program to continue beyond the volunteer period.

Honors Mathematics Tutor Jan. 2023 – June 2023

OCC Student Success Center *Costa Mesa, CA*

- Tutored 10–12 students daily in calculus (single and multi-variable), precalculus, trigonometry, and college algebra
- Led study groups and exam review sessions for honors calculus 1.
- Recognized by faculty and students for fostering a collaborative and motivating learning environment.

Projects

Tiled Matrix Multiplication Visualizer | *HTML, JS, Parallel Programming* Feb. 2026

- Built an interactive visualizer to demonstrate tiled matrix multiplication, data reuse, and memory access patterns.
- Published code on github and deployed at aypuri.com/tiledmatmultvis.

ESP32 Bluetooth Speaker | *Microcontrollers, Circuit Design, C++* Apr. 2025

- Built a Bluetooth speaker with a display showing title, artist, and album, powered by an ESP32 microcontroller.
- Published code on github

DSA Visualizer | *TypeScript, Web Development* Apr. 2024

- Co-created a web application with a TypeScript back-end to help students visualize core data structures (linked lists, trees, graphs, stacks, queues), bridging theory with intuitive graphics.
- Published code on github and deployed at animated-octo-spork.vercel.app

Technical Skills

Languages: C/C++, Python, SystemVerilog, JavaScript, MIPS Assembly
Frameworks & Libraries: OpenCL, PyTorch, OpenCV, CUDA, NumPy/SciPy, scikit-learn
Platforms & Hardware: NVIDIA Jetson, Arduino, ESP32, ARM64 (Pixel Fold)
Tools: Git, Linux, Kubernetes, Docker, MATLAB, Cadence Virtuoso