# ABHAY SHUKLA

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# **EXPERIENCE**

## **Stanford Center for Biomedical Informatics Research**

November 2024 - Present

Gevaert Lab Student Researcher

California

- · Implemented computer vision models (CNNs, Vision Transformers) for breast cancer region segmentation in medical imaging.
- · Developed physics-inspired neural networks to correct unrealistic breast compression during the medical imaging process.
- · Designed Python data processing pipelines for efficient handling of large-scale biomedical datasets on multi-node systems.

# UCLA COSMOS (Brain-Inspired Computing/Artificial Intelligence Cohort)

July 2024 - August 2024

California

- Developed neural networks based on neurobiological principles to model rat hippocampus activity, perform image geolocation, and character recognition.
- · Applied computational modeling techniques to neuroscience problems using Jax, Torch, and TensorFlow.

# FRC Team 604: Quixilver Robotics

June 2022 - Present

Controls/Software Lead (10)

Student Researcher

California

- · Implemented real-time computer vision systems for autonomous robot navigation and object detection.
- · Designed stratgic robotic mechanisms and integrated multi-modal sensors for optimal robot performance and reliability.
- · Developed competition data collection infrastructure and visualization tools analyzing 1000+ competition matches with 200+ users.
- · Achieved top 0.1% international ranking (12/10,000+ teams) through integrated hardware-software optimization.

**Pavvl** January 2025 - Present Software Design Advisor California

- · Evaluated memory and computational efficiency of infinite context large language models.
- · Recommended app optimizations for model accuracy, external tool integration, and response time.

## **Bay Area STEM Academy**

January 2023 - Present

Co-founder

California

- · Created and led nonprofit organization teaching 525+ students to robotics, astrophysics, 3D design, and machine learning.
- Secured \$6,000+ in funding and city grants to support local STEM education initiatives, recruited and managed 25+ academy mentors

#### **PROJECTS**

#### StereoSampleGAN - Independent Research Project

- · Developed pioneering generative adversarial network addressing critical research gaps in high-quality stereo audio synthesis.
- · Implemented efficient image-like audio representations and efficient model training techniques.
- · Achieved 85% quality improvement and 25x training time reduction compared to industry benchmarks
- · Skills: Time-Series Data, Multimodality, PyTorch, NumPy, DSP

## Vox Transformis - Science Fair Research Project

- · Developed LLM-based multimodal musical translation system preserving rhythmic, melodic, and artistic features of sung audio.
- · Skills: Model Ensembling, LLM Manipulation, Signal Processing, Model Context Protocol

## SporeStrike - Entrepreneurship Project

- · Designed computational models for drone-based fungal infection treatment system and created prototype 3D printed hardware components.
- · Won first place/260 teams at 2024 FlexFactor Entrepreneurship Championships.
- · Skills: Real-World System Design, CAD, 3D Printing

### **EDUCATION**

**Leland High School** 4.00 UW A-G Junior (Expected Graduation 2026) San Jose, CA

SKILLS

**Technical Fields** AI/ML, Data Visualization and Analysis, Robotics, Signal Processing, 3D Printing, Web Development

#### HONORS & AWARDS

• F	RC604: City of	San Jose F	Recognition 1	for STEM	Outreach and	Team P	erformance	
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2024 2024

• WCP CADathon/Robot Design Challenge Finalist (Top 1% Internationally)

2024

FRC604: World Championship Milstein Division Winner (12/3500 Internationally, 4/300 in CA)

• OneHacks III Hackathon: Third Place (3/120 Internationally)

2023