

# 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 systematic breast compression error during breast medical imaging.
- 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

*Student Researcher*

*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)*

*California*

- Implemented real-time computer vision systems for autonomous robot navigation and object detection.
- Designed strategic 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.

### Pavyl

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

- |  |      |
|--|------|
| • FRC604: City of San Jose Recognition for STEM Outreach and Team Performance                | 2024 |
| • WCP CADathon/Robot Design Challenge Finalist (Top 1% Internationally)                      | 2024 |
| • FRC604: World Championship Milstein Division Winner (12/3500 Internationally, 4/300 in CA) | 2024 |
| • OneHacks III Hackathon: Third Place (3/120 Internationally)                                | 2023 |