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 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.

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.
- Won Honorable Mention Award out of 977 participants at 2025 Santa Clara Synopsys Science Fair; invited to present findings to San Jose Mayor Matt Mahan.
- Skills: Model Ensembling, LLM Manipulation, Signal Processing, Model Context Protocol

SporeStrike - *Entrepreneurship Project*

- Designed computational models for drone-based fungal infection treatment system, created prototype 3D printed components.
- Presented project to civil and aerospace engineering pannel; won first place/260 competitors 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%, 1000+ participants) 2024
- FRC604: World Championship Milstein Division Winner (12/3500 Internationally, 4/300 in CA) 2024
- OneHacks III Hackathon: Third Place (3/120 Internationally) 2023