

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
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