ABHAY SHUKLA

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EXPERIENCE

Stanford Center for Biomedical Informatics Research November 2024 - Present
Gevaert Lab Student Researcher *California*

- Developed novel physics-based neural networks utilizing PDEs to transform single medical images into multiple anatomical states (varying breast compression levels, respiratory phases, cardiac cycles, etc), increasing training data diversity and helping model generalizability.
- Implemented computer vision models (CNNs, Vision Transformers) for precise breast region segmentation.
- 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 to model rat hippocampus activity, perform image geolocation, and character recognition.
- Applied neurobiological priors to computational modeling techniques 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.

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