

ABHAY SHUKLA

01shuklabhay@gmail.com | <https://www.linkedin.com/in/shuklabhay/> | <https://github.com/shuklabhay> | <https://shuklabhay.github.io>

EXPERIENCE

Stanford Center for Biomedical Informatics Research

November 2024 - Present

Gevaert Lab Student Researcher

California

- Developed physics-based neural networks for anatomically constrained image augmentations (e.g., tissue compression, respiratory/cardiac phase variations), improving cancer detection accuracy by 4–20%.
- 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.

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 maximum 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.

UCLA COSMOS (Neurobiology and AI Cohort)

July 2024 - August 2024

Student Researcher

California

- Developed neural networks to model rat hippocampus activity, perform image geolocation, and recognized handwritten characters.
- Applied neurobiological priors to computational modeling techniques using Torch and TensorFlow.

Pavyl

January 2025 - May 2025

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

Voquel - Algorithm Demos

- Developed a full-stack AI translator/dubber preserving rhythm, emotion, and artistic intent across languages.
- Created efficient GPU-accelerated DSP pipeline optimised for 4 GB VRAM consumer GPUs.
- Received Honorable Mention at the 2025 Synopsys Science Fair (top 10% out of ~1000 competitors); 30+ hours of Voquel-translated content watched on YouTube.

Tessera - Product Display

- Developed an end-to-end conversational voice agent for auditory rehabilitation through adaptive listening exercises.
- Engineered context-aware LLM-managed session state, enabling personalised progression in a lightweight (30 MB) app ready for clinical use.

PercGAN - Independent Research Project

- Developed a generative adversarial network addressing critical research gaps in lightweight high-quality stereo audio synthesis.
- Implemented image-like audio representations and efficient model training techniques.
- Achieved an 85% quality improvement and a 25× training-time reduction compared with industry benchmarks.

SporeStrike - Entrepreneurship Project

- Designed computational models for drone-based fungal infection treatment system, created prototype 3D printed components.
- Presented the project to a civil and aerospace engineering panel; won first place out of 260 competitors at the 2024 FlexFactor Entrepreneurship Championships.

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

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| • 2025 Synopsys Science Fair Honorable Mention (Top 10%, 975+ Participants) | 2025 |
| • 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 |