ABHAY SHUKLA

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EXPERIENCE

Stanford Center for Biomedical Informatics Research November 2024 - July 2025
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); translated content has been watched by 250k+ viewers on YouTube.

Tessera - *Landing Page*

- 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 aerial 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

- 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