ABHAY SHUKLA

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EXPERIENCE

Stanford Center for Biomedical Informatics Research <div align="right">November 2024 - Present</div>
Gevaert Lab Student Researcher <div align="right">*California*</div>

· 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 <div align="right">June 2022 - Present</div>
Controls/Software Lead (10) <div align="right">*California*</div>

· 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) <div align="right">July 2024 - August 2024</div>
Student Researcher <div align="right">*California*</div>

· 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.

PROJECTS

Voquel - *Algorithm Demos*

· Full-stack AI translator/dubber preserving rhythm, emotion, and artistic intent across languages.
· Efficient GPU-accelerated DSP pipeline optimised for 4 GB VRAM consumer GPUs.
· Drag-and-drop uploads, YouTube import, real-time progress dashboard, and inline media player for a seamless user experience.
· Honorable Mention at the 2025 Synopsys Science Fair (top 10% out of ~1000 competitors); 30+ hours of Voquel-translated content watched on YouTube.

Tessera

· End-to-end conversational voice agent designed for auditory rehabilitation through adaptive listening exercises.
· Session state managed entirely by an LLM session, 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 <div align="right">*4.00 UW A-G*</div>
Junior (Expected Graduation 2026) <div align="right">*San Jose, CA*</div>

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