

# ABHAY SHUKLA

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## EXPERIENCE

- Stanford Center for Biomedical Informatics Research**  
*Gevaert Lab Student Researcher*

November 2024 - July 2025  
California

  - Worked with researchers from Stanford, UPenn, and UC Davis to developed PINNs for physically constrained medical image augmentation, 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**  
*Controls/Software Lead (10)*

June 2022 - Present  
California

  - Implemented real-time localization and piece detection computer vision systems for three large-scale, 125lb competition robots.
  - Designed and led the fabrication of numerous robot components, applying advanced techniques in both additive manufacturing (TPU, PETG, PLA 3D printing) and sheet metal construction.
  - Brought the team to top 0.1% international ranking (5/3,500+ teams) in 2024.
  - Developed data collection infrastructure powering 200+ users to analyze 1000+ competition matches.
- UCLA COSMOS (Neurobiology and AI Cohort)**  
*Student Researcher*

July 2024 - August 2024  
California

  - Created a digital twin to model rodent pathfinding capabilities, accurately replicating true navigational behaviors and cell activations.
  - Developed a UCLA campus image geolocation model by organizing campus-wide video data collection, creating custom artifact-free frame extraction, and using the resulting 1,500+ curated images to fine tune AlexNet.

## PROJECTS

- Voquel - Algorithm Demos**
  - Full stack LLM-enhanced research project for accessible audio translation with a focus on preserving rhythm, emotion, and artistic intent.
  - Content translated by Voquel has a total audience of 550k+ people over 70 different videos.
  - Received Honorable Mention at the 2025 Synopsys Science Fair (top 10% out of ~1000 competitors); recognized by the City of San Jose for language preservation efforts.
- PercGAN - Independent Research Project**
  - Developed a lightweight generative network for high-fidelity stereo percussion generation presenting unique audio representation and enhanced StyleGAN architecture.
  - Achieved an 85% quality improvement and 25× training-time reduction compared to WaveGAN, MelGAN, etc..
- Tessera - Landing Page**
  - Developed an end-to-end conversational voice agent delivering adaptive listening exercises for auditory rehabilitation.
  - Engineered context-aware LLM-managed session state, enabling personalized progression in a 30 MB application optimized for clinical deployment.
- SporeStrike - Entrepreneurship Project**
  - Created aerial fungal infection treatment system with 3D-printed prototype components for targeted agricultural application.
  - Won first place out of 260 teams at the 2024 FlexFactor Entrepreneurship Championships, presenting to civil and aerospace engineering panels.

## EDUCATION

- Leland High School**  
Junior (Expected Graduation 2026)

4.00 UW A-G  
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)
  - WCP CADathon/Robot Design Challenge Finalist (Top 1%, 1000+ participants)
  - FRC604: World Championship Milstein Division Winner (5/3500 Internationally)
  - OneHacks III Hackathon: Third Place (3/120 Internationally)
- 2025

2024

2024

2023