

# ABHAY SHUKLA

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## EXPERIENCE

### UCLA COSMOS (CA Summer School for Mathematics & Science)

Brain-Inspired Computing Cohort Member

2024

California

- Gained proficiency in 20+ key machine learning mechanisms under mentorship of Prof. Hugh Tad Blair. Explored intersection of biological mechanisms and computing.
- Developed ML problem-solving and data analysis skills by applying theoretical learnings to practical assignments.

### FRC 604: Quixilver Robotics

Controls/Software Lead (10)

2022 - Present

California

- Enhanced robot capabilities with computer vision and sensor integration, contributed to team software (particle filter localizer, time-optimal trajectory optimizer).
- Developed progressive web app for TheBlueAlliance, modernizing the widely-used platform providing real-time access to 30 years of competition and team data.
- Led subteams in design, manufacturing, and programming of FRC team robot while teaching new members about robot development.

### Bay Area STEM Academy

Cofounder

2023 - Present

California

- Introduced 450+ 3rd-9th grade students to robotics, machine learning, programming, and 3D design.
- Raised \$5300+ to support local STEM education and children health foundations. Recruited 15+ academy mentors.

## PROJECTS

### StereoSampleGAN

GitHub Repo: <https://github.com/shuklabhay/stereo-sample-gan>

- WGAN-based approach for generating high-fidelity stereo audio samples by leveraging attention mechanisms, optimized loss functions, and effective signal processing. Research partially funded by UCLA and pending publication.
- Overcame low-quality monophonic limitations of existing audio generation methods with a 99.77% reduction in training epoch count and 9.56x reduction in parameter count.

### Quickscout

GitHub Organization: <https://github.com/frc604>

- Developed scalable application for multimodal FRC event data collection and visualization. New captured metrics empower informed strategic decisions at high-stakes competitions, contributing to the team's international success.
- Supports 130+ users on FRC604, collected data for 700+ team robots over 1 year. Trained 10+ team members in webdev to build app and expand application capabilities to fit annual challenges.

## EDUCATION

### Leland High School

Junior

4.00 UW A-G

San Jose, CA

## SKILLS

### Technical Fields

AI/ML, Robotics, Signal Processing, CAD, 3D Printing, Webdev/Appdev

### Other

Digital Audio Production, Graphic Design, Video Editing

## HONORS & AWARDS

- |   |      |
|---|------|
| • FRC604: World Championship Milstein Division Winner (12/3500 Internationally + 4/300 in CA) | 2024 |
| • NextFlex FlexFactor: Entrepreneurship Competition Winner (1/260 in CA)                      | 2024 |
| • OneHacks III Hackathon: Third Place (3/120 Internationally)                                 | 2023 |
| • SCU/SVUDL Invitational: PF Debate Finalist (2/140 Internationally)                          | 2022 |