

ABHAY SHUKLA

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EXPERIENCE

FRC 604: Quixilver Robotics

Controls/Software Lead (10-11)

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.

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 Dr. 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.

Bay Area STEM Academy

Cofounder

2023 - Present

California

- Introduced 700+ 3rd-9th grade students to diverse STEM topics including robotics, machine learning, programming, and 3d design.
- Raised \$6000+ to support local STEM education and children health foundations. Recruited 15+ academy mentors.

PROJECTS

StereoSampleGAN

Git Hub 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.

Quickscore

Git Hub 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.

Domotron

Robot Website: <https://604robotics.com/2023-2024-crescendo/>

- Developed computer vision and physics-based shot calculations, driver control automation, and competitive autonomous routines for world championship division winning robot.
- Designed climber winch mechanism and robot vertical elevator, maximizing robot's competitive capabilities and earning the robot the Industrial Design, Innovation in Control, and Autonomous Awards.

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