

ABHAY SHUKLA

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EXPERIENCE

FRC 604: Quixilver Robotics

June 2022 - Present

Controls/Software Lead (10-11)

California

- Develop team's competition data collection application, contribute to team's particle filter, time-optimal trajectory optimization software, and yearly robot control architecture.
- Enhance robot capabilities and localization with computer vision and environmental sensors.
- Lead subteams in design, manufacturing, and programming of team robot while training new members to contribute to robot development. Personally attended 20+ STEM community outreach events.
- Contribute to universally used FRC tool TheBlueAlliance: a global competition data aggregation and insight platform.

UCLA COSMOS (2024 Cluster 1)

July 2022 - August 2024

AI Cohort Student

California

- Participated in highly selective 4 week UCLA Neurology and AI Summer Program (14.6% acceptance rate).
- Developed comprehensive understanding of transformers, recurrent networks, advanced regression, reinforcement learning, convolutional models, and training optimization.

Bay Area STEM Academy

April 2023 - Present

Cofounder

California

- Developed engaging curriculums, managed logistical aspects, recruited mentors, and effectively taught multiple in-person and online camps encompassing diverse STEM fields.
- Impacted 500+ students and raised \$4800+ to support organization costs, local robotics team STEM outreach initiatives, and underserved Indian children healthcare foundation.

PROJECTS

StereoSampleGAN

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

- Introduces a novel machine learning architecture to generate stereo, time-frequency representations of audio samples.
- Independent research project pending publishing, continuation of UCLA COSMOS 2024 Research.
- Takeaways: Advanced ML Training Techniques, Attention/Transformers, GANs, Signal Processing, Data Representation, Data Collection, AI Research.

Quickscout

GitHub Organization (Private Team Project): <https://github.com/frc604>

- Flexible application for data capture and visualization allowing informed strategical decisions during competition.
- Led app development, trained 10+ team members in web dev to build app and adapt to yearly games. Actively used by FRC604: 130+ users, data collected for 700+ robots.
- Takeaways: Modular App Design, Big Data Collection and Visualization, Full Stack Development.

Domotron (FRC604 2024 Robot)

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

- Ranked 4/300 California teams, 12/3500 internationally. World championship division and two time California regional event winning robot.
- Developed physics-based shot calculations, driver control automation, competitive autonomous routines. Designed climber winch mechanism and vertical elevator.

VelocityDraft

Website: <https://shuklabhay.github.io/velocity-draft/>

- Leverages user writing abilities and essay deadlines to algorithmically determine best order of essay writing to maximize writing and review time and prevent overwhelming users.
- Third place project in OneHacks III Hackathon.

- Takeaways: GitHub Action Automation, Algorithmic Problem Solving, Website Interface Design

EDUCATION

Leland High School	<i>Expected June 2026</i>
Junior	<i>San Jose, CA</i>

SKILLS

Technical Fields	AI/ML, Robotics, Signal Processing, CAD, 3D Printing, Webdev/Appdev
Other	Digital Audio Production, Graphic Design, Video Editing

HONORS & AWARDS

• NextFlex FlexFactor: Santa Clara Regional Winner	May 2024
• NSE Level 2: Silver Distinction	May 2024
• OneHacks III Hackathon: 3rd Place Submission	August 2023