

# ABHAY SHUKLA

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## EXPERIENCE

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### 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, Holonomic Time Optimized Autonomous Path Planner, and Yearly Robot Control Software.
- Enhance robot capabilities and localization by utilizing computer vision and environmental sensors.
- Contribute to a universally used FRC tool TheBlueAlliance: a global competition data aggregation and insight platform.
- 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.
- 2024 Season: 4th ranked team in California, 12th out of 3500 participating teams. Won International World Championship Division and two California Regional Events.

### 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).
- Rapidly developed comprehensive understanding of transformers, recurrent networks, advanced regression, reinforcement learning, convolutional models, and training optimization.
- Started program without any prior knowledge, created and optimized numerous architectures for given use cases.

### Bay Area STEM Academy

April 2023 - Present

*Cofounder*

*California*

- Cofounded non-profit organization to host accessible and engaging free STEM camps for local elementary, middle, and high school students.
- 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.

### Leland Speech and Debate (NSDA)

August 2022 - Present

*Varsity Speaker*

*California*

- Develop robust arguments and refine argumentation skills on national and international issues through competitive debate.
- Rapidly synthesize compelling and appealing speeches using current events and existing knowledge.
- Competed in 20+ tournaments as a member of the selective, nationally ranked (3rd out of 3550+ NSDA programs) team.

## PROJECTS

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### 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.

### Quicksout

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

- Provides intuitive and easily modifiable data collection interfaces for effective data collection and flexible control over data capture/visualization.
- Integrates collected data and external sources to create insightful visualizations, enabling comprehensive competitive analysis.
- Comprehensive data collection enables the creation of new metric visualizations on demand and ultra-informed strategic decisions.
- Mainly led app development, trained 10+ team members in web dev to build app in a modular to build and adapt the app to yearly games.

- Actively used by FRC604: 100+ users, data collected for 670+ robots.
- Takeaways: Dynamic App Design, Insightful Data Visualization, Big Data Collection and Processing, Full Stack Development, Intuitive Interface Design

**Domotron (FRC604 2024 Robot)**

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

- Maximized ranking points by incorporating speaker, amplifier, and trap scoring capabilities.
- 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.
- Recieved third place prize in OneHacks III Hackathon.
- Takeaways: GitHub Action Automation, Algorithmic Problem Solving, Website Interface Design

**EDUCATION**

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

**SKILLS**

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<b>Relevant Fields</b>	AI/ML, Robotics, Signal Processing, CAD, 3D Printing, Webdev/Appdev, Digital Audio Production, Graphic D
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**HONORS & AWARDS**

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| • NextFlex FlexFactor: Santa Clara Regional Winner | May 2024      |
| • NSE Level 2: Silver Distinction                  | May 2024      |
| • OneHacks III Hackathon: 3rd Place Submission     | August 2023   |
| • PSVA: Gold Award                                 | July 2023     |
| • CFL Speech 2: Finalist                           | December 2022 |
| • SCU/SVUDL Invitational: PF Finalist              | November 2022 |