

# Josh Hejna

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## EDUCATION

### LOS ALTOS HIGH SCHOOL

#### CURRENT SENIOR

Expected June 2020 | Los Altos, CA  
Cum. GPA: 4.0 / 4.0  
Weighted GPA: 4.5 / 4.0  
(GPA across all institutions)

## LINKS

Github:// [lytigas](#)  
Personal:// [Josh](#)

## COURSEWORK

### STANFORD UNIVERSITY

Data Mining and Analysis  
Differential Equations  
Signals And Systems

### JOHN HOPKINS CENTER FOR TALENTED YOUTH

Data Structures and Algorithms  
Number Theory  
Advanced Robotics

### FOOTHILL COLLEGE

Multivariable Calculus  
Linear Algebra

### LOS ALTOS HIGH SCHOOL

AP Statistics  
AP Calculus BC  
AP Physics C  
AP Chemistry  
Mandarin III

### COURSERA

Cryptography I  
(from Stanford University)

## SKILLS

### PROGRAMMING

C++ • C • Rust • OpenCV • Python  
ROS • Java • R • HTML/CSS • Javascript  
Bash • Node.js •  $\LaTeX$

### SOFTWARE DEVELOPMENT

Linux/SystemD • \*nix Tools • Git • CI  
Docker • CMake • Makefile  
DNS • SQL/RDBMS

## WORK EXPERIENCE

### NVIDIA EMBEDDED | JETSON INTERN

Summer 2018 | Santa Clara, CA

- Collaborated with internal team of 4 and high-school intern team of 10.
- Developed low-cost solution for the autonomous indoor navigation of mobile robots using a Camera and Deep Learning to augment a 2D-LIDAR. The system addressed the challenge of obstacles LIDAR could not detect, such as meshes or glass, and obstacles below the LIDAR scanning height.
- Integrated system with ROS to make use of existing robotics libraries.
- Deployed to and did bringup of Jackal Mobile Robot Development Platform modified to use an Nvidia Jetson TX2 SoC.

## EXTRACURRICULARS

### LAHS FIRST ROBOTICS TEAM 114 | CAPTAIN

May 2018 - Present | Los Altos, CA

- Project-managed the operations of 30+-person team operating on a tight 6-week deadline with zero parent involvement. Division semi-finalists at World Championships.
- Delivered execution of items on the critical path throughout project.
- Lead strategic analysis of the game task, ensuring all team members were heard.
- Reviewed designs to ensure consistency with strategic vision and viability.
- Managed budget and oversaw the acquisition of sponsors.

### LAHS FIRST ROBOTICS TEAM 114 | SOFTWARE LEAD

January 2017 - Present | Los Altos, CA

- My 2019 Robot Code won the "Innovation in Control" Award
- Bootstrapped and trained a robust software team from students with zero experience.
- Implemented extensible development framework for autonomous control.
- Created a documented team culture around strong use of version control, continuous integration, and static analysis.
- Managed a productive team of 5 on tight deadlines.
- Conducted competitive analysis of other teams and implemented best practices to ensure the reliability and extensibility of the codebase.
- See the Projects section below for a list of software I specifically wrote.

### LAHS MATH MODELLING TEAM | MEMBER & PRESIDENT-ELECT

October 2018 - Present | Los Altos, CA

- Collaborated with 4 others on tight time schedule in numerous mathematical modelling competitions.
- Set strategic vision and problem solving approaches.
- Produced extensive write-ups detailing assumptions, data collection, methods, models, sensitivity analysis, and model impacts.
- The team was a High School Mathematical Contest in Modeling Finalist and an International Math Modeling Challenge Qualifier out of 785 teams.
- Developed the model that won 1st place in the 2019 Modeling The Future Challenge out of 215 competing teams.
- The team received an Honorable Mention in the undergraduate Mathematical Contest in Modeling.

## NON-TECHNICAL

Leadership • Project Management  
Written and Verbal Presentation  
Event Planning • Outreach  
Excel • MSProject

## ACHIEVEMENTS

### HACKS

2018 10<sup>th</sup>/90  
Los Altos Hacks III Hackathon

### TESTS

SAT Math II - Perfect Score  
SAT - 1570/1600  
PSAT - Perfect Score x2

### MATH COMPETITIONS

See "LAHS Math Modelling Team"

2018 HiMCM Finalist  
2019 MTF 1st Place Winner  
2019 MCM Honorable Mention

## REFERENCES

Academic and Personal references  
available upon request.

## PROJECTS

### ROBOTICS

Sole author of the following

- Java library for fitting interpolating splines of arbitrary degree through waypoints.
- Pure Pursuit Controller that follows paths exported from a visual path planning web interface from scratch.
- Trapezoidal Motion Profile generation for robot control.
- Fully Holonomic "Swerve" drive train inverse kinematics.
- A Rust (programming language) library for interfacing with FIRST Robotics Competition Hardware and deploying compiled code. The library is used across the globe; its development taught me about object code, linking, shared objects, ELF, etc.
- Rust library for transforming between arbitrary coordinate frames in two dimensions.
- Rust library for fitting  $\eta^3$ -splines to be followed by a wheeled mobile robot.
- Integrated a networked co-processor (Raspberry Pi and Nvidia Jetson with Auvideo J120 Carrier) for camera processing and low-latency streaming, including interop between Rust and C++.
- Flashed third-party firmware onto routers and created custom network topology for more rapid development.
- Robot telemetry dashboard with Rust backend and Websockets-based frontend. Supports broadcasts to multiple clients, diffing, and elimination of redundant data.
- Automated visual targeting code for autonomous placement of a rigid object by mobile robot.
- Modelled a non-linear robot elevator to gain-schedule a motion profile follower.
- Authored an original 18-page team handbook and an associated year-long curriculum.

### SERVERS/LINUX

- Self-hosted and managed Linux VOIP/Chat/Game/Web servers from when I was 11.
- Installed Arch Linux on my personal laptop. Using Linux for everything, all the time, ever since.
- SystemD service files for deployments of various projects.
- Udev rules for robotics hardware.

### WEB

- A web version of a social deduction board game.
- A feedback collection application for a Stanford communications class in Node.js.
- The event-management system for Los Altos Hacks, which employs an SPA frontend and Flask REST API backend.

### MISCELLANEOUS

- An Ethereum (blockchain) smart contract for a decentralized imageboard.

## LOS ALTOS HACKS ORGANIZING TEAM | TECH TEAM

October 2018 - Present | Los Altos, CA

- Programmed an event registration and management system from scratch.
- Employed remote and asynchronous development practices to ensure deadlines were met.
- Deployed software to AWS and hundreds of users.
- Lead Capture-The-Flag competition development and execution for the event.

## MVLA SPEECH AND DEBATE | CIRCUIT LINCOLN DOUGLAS CAPTAIN

August 2016 - Present | Mountain View, CA

- Competed at the national level, including 3 out-of-state competitions.
- 5 years total experience.
- Versed in Analytic/Continental Philosophy as well as Critical Theory.
- Drafted and upheld robust preparation and documentation policy.
- Independently developed out-of-state travel system and delivered on deadlines.

## LAHS CONCERT CHOIR | BASS II

August 2016 - Present | Los Altos, CA

- Invited to sing bass for renowned Los Altos High School Main Street Singers.
- Provided technical support for video and document production.

## WATER POLO | GOALIE

October 2014 - January 2017 | Los Altos, CA