

# Shihao Cao

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## EDUCATION

### THOMAS JEFFERSON HS FOR SCI/TECH

Current Senior | Alexandria, VA  
GPA: 4.527 / 4.0

## LINKS

LinkedIn:// [shihaocao](#)  
YouTube:// [Shasty88](#)  
Github:// [Shasty88](#)  
Facebook:// [shihao.cao.5](#)

## COURSEWORK

### HIGH SCHOOL

Quantum Mechanics & Electrodynamics  
Multivariable Calculus  
**Advanced Math Techniques**  
Computer Vision  
Artificial Intelligence  
Energy Systems (*Research*)  
Robotics  
Prototyping

AP Physics C Mech. and E/M  
AP Computer Science A  
AP Calculus BC  
AP Chemistry

## SKILLS

### MECHANICAL

**Design Software:**  
Fusion 360 (*CAD & CAM*) • AutoCAD  
ANSYS Fluent • Autodesk CFD  
Mathematica • Matlab  
**Hardware:**  
CNC Mill, Router & Lathe  
MIG Welding (*Steel & Aluminum*)  
Laser Cutter • 3D Printing  
Fine Woodworking • Metal Casting  
Band Saw • Table Saw • Drill Press

### ROBOTICS

5+ years experience:  
RC Aircraft (*Design, Construction and Piloting*)  
2+ years experience:  
Raspberry Pi • Flight Computers  
Mission Planner • Arduino  
**Familiar:**  
MAVProxy • DroneKit

### PROGRAMMING

2+ years experience:  
Python • Shell • Java • C++ • GitHub  
OpenCV (*Python and C++*) • Linux

## EXPERIENCE

### EXOANALYTIC SOLUTIONS | INTERN

Jun 2018 - Aug 2018 | Reston, VA

- Researched cost effective RF and Visual drone detection solutions.
- Rapid prototyped a fully operational deployable drone detector prototype.

### KASHMIR ROBOTICS | INTERN + TEST PILOT + INSTRUCTOR

Oct 2016 - May 2018 | Great Falls, VA

- Researched computer vision for aerial imaging and machine learning.
- Primary test pilot for fixed wing and multirotors prototypes.
- Built multiple Pixhawk based custom multirotors.
- Operated autonomous missions using Mission Planner and QGroundControl.

## CLUBS

### TJ UNMANNED AERIAL VEHICLE TEAM | PRESIDENT + FOUNDER

Sept 2018 - Present | Alexandria, VA

- Lecture students on programming, CAD, electronic and aerodynamics.
- Spearhead and manage development of **fixed wing UAVs** for **AUVSI SUAS**
- Instruct students on how to fly RC aircraft and operate UAVs.

### TJ NANOSATELLITE TEAM | PROJECT MANAGER + SYSTEMS ENGINEER

Sept 2016 - Present | Alexandria, VA

- Manage development of **TJREVERB**, a 2U communications satellite.
- Spearhead development of VHF radio and Python OS software.
- Primary hardware and software integrator.

### TJ FIRST ROBOTICS COMPETITION TEAM | TEAM MEMBER

December 2018 - Present | Alexandria, VA

- Worked on object grabbers and launchers.
- Led rapid prototyping team for elevator systems.

## PERSONAL PROJECTS

### THRUST VECTORING EDF VERTICAL ROCKET LANDER | JAN 2018

I designed and built a **thrust vectoring system for an EDF** (Electric Ducted Fan). I used a 90mm EDF with a 6S Li-Po and a 100A ESC. The system delivers about 4 pounds of thrust and has a 1.2 thrust to weight ratio capable of hovering.

### REMOTE CONTROL F-86 SABRE | MAY 2018

I designed, built and flew a 700mm wingspan **RC F-86 Sabre** powered by a 12 blade 64mm EDF, 4S Li-PO and a 80A ESC. I used Fusion 360, AutoCAD, and Autodesk CFD to do the design work. I've outlined my project on my website and YT.

### ELECTRIC LONGBOARD | JUN 2015

I built an **electric longboard** powered by a brushless motor and Li-Po batteries. It's capable of accelerating up to 25 kph up a 20-degree incline and has a 5km range.

## AWARDS

2019	Regional	<b>HackTJ 2019 Best Hardware Hack</b>
2019	Finalist	FIRST Robotics Competition CHS District Blacksburg
2017	Regional	HackTJ 2017 Fannie Mae Award
2016	2 <sup>nd</sup> /425	Freshman Robot Speed Design Challenge
2016	1 <sup>st</sup> /24	Freshman Impossible Robot Design Challenge