

## RUBEN CASTRO ORNELAS

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### Education

#### Massachusetts Institute of Technology

June 2022

*Candidate for B.S. in Mechanical Engineering with Robotics Concentration*

Cambridge, MA

- Coursework: Multivariable Calculus, Physics I, Introductory Biology

#### Sonoran Science Academy High School

Dec 2017

- Golden Honors, GPA: 4.25
- Coursework: Calculus AB, BC and 3, Linear Algebra, AP Physics, AP Language and Composition

Tucson, AZ

### Experience

#### MIT Media Lab: Center for Bits and Atoms

Sept 2018-Present

*Undergraduate Researcher*

Cambridge, MA

- Responsible for the creation of a modular, networked DC Motor Controller for robotic systems
- Tasked with implementing current and position sensing hardware to motor controllers, as well as the firmware to control current and position loops, with search algorithms to automatically tune control parameters

#### MIT Edgerton Center

Jan 2018 – Present

*Educator*

Cambridge, MA

- Worked on engineering outreach, promoting maker ideals to people of all ages
- Taught domestic and international teachers and students ages 10 to 18 engineering design along with the use of Arduino, 3D printers, laser cutters, basic machinery, and general electrical tools and components
- Mentored a 6-person high school team building a Segway from scratch using aluminum, FIRST robot parts, Arduino, and PID control to better understand engineering design
- Advised group of 60 Chinese middle school and high school students in the making of underwater Remotely Operated Vehicles (ROVs)
- Instructed group of 25 Saudi Arabian high school students doing small, hands-on maker projects

#### MIT McGovern Institute for Brain Research: Fee Lab

Sept 2018- Present

*Undergraduate Researcher*

Cambridge, MA

- Working on designing 3D printed micro-enclosure for pressure sensor being used in an implant for songbirds.

#### CRUSH (Creating Robots Under Severe Heat)

Oct 2015 - Dec 2017

*Team Captain, Head Programmer*

Tucson, AZ

- Won 2017 FIRST Robotics Competition World Championship
- Implemented Java code for a robot to autonomously follow, adjust to error, and handle subsystems
- Created an easy to use and modular GUI application to generate robot trajectories with S-Curve motion profiles
- Developed code for a camera to track retroreflective tape and obtain distance and angle to it using OpenCV
- Wrote sponsorship package to attract and obtain sponsors
- Designed critical robot mechanisms using SOLIDWORKS

### Skills

- Programming: Java, Arduino, OpenCV, LabVIEW, C, HTML, and Python
- Design/CAD: SOLIDWORKS, 3D printing, laser cutting
- Basic shop machinery along with most hand and electrical tools
- Languages: Fluent Spanish, English

### Awards and Competitions

#### 2016- 2017 Sonoran Science Academy Principal's Award

- Highest recognition given by Sonoran Science Academy High school given to a single student each year

#### 2017 First Robotics Competition Colorado Dean's List Finalist Award

- Awarded to ~150 students internationally based on ability to motivate and lead others, passion, entrepreneurship, and creativity