

RUBEN CASTRO ORNELAS

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Education

Massachusetts Institute of Technology

June 2022

GPA: 4.8/5.0

Candidate for B.S. in Mechanical Engineering

Cambridge, MA

- Coursework: Bio-inspired Robotics, Electronics for Mech Systems, Machine Learning, Underactuated Robotics
- Current Undergrad Thesis: Hardware design of 3 DOF finger for dynamic piano playing

Experience

Multiply Labs

June 2021-August 2021

Robotics Engineering Intern

Cambridge, MA

- Designed, fabricated, and tested novel end effector for manipulating medical devices to be used with a UR5 arm
- Led research to allow food-grade consumable with tight tolerances to be injection molded. Quoted 100k parts
- Compared and worked with vendors to obtain best tool-changing system for cell therapy manufacturing robots

MIT Media Lab: Center for Bits and Atoms

Sept 2018-March 2020

Undergraduate Researcher

Cambridge, MA

- Designed and built laser-cutable 3 axis gantry machine to be used for high-speed PCB and sheet plastic milling
- Led design for open-source and easy to construct Instron-like machine for fab-labs around the world
- Developed a modular, networked DC Motor Controller board with current & position control for robotics

MIT Edgerton Center

Jan 2018 – Present

Head Educator

Cambridge, MA

- Co-headed month-long engineering design workshop for high school students with \$25,000 budget
- Ran hackathon-style hands-on making workshops in Ferrara, Italy and Barcelona, Spain
- Mentored a six-person high school team building a Segway from scratch to teach engineering design

World Champion FIRST Robotics Competition (FRC) Team CRUSH1011

Oct 2015 - Dec 2017

Team Captain, Head Programmer

Tucson, AZ

- Designed critical robot mechanisms using SOLIDWORKS such as a grappling hook mechanism and a catapult
- Created easy to use and modular GUI application to generate robot trajectories with S-Curve motion profiles
- Developed code for a camera to track goals and obtain distance and angle to it using OpenCV

Projects

Sand Locomotion Analysis

- Coded and tuned operation-space impedance controller + trajectory optimizer for robotic leg sand locomotion
- Made MATLAB simulation incorporating sand force response and inertial elements to validate experiment data

NASA 60s Space Race Science Article

- Wrote 13-page science article on NASA media's impact on public opinion, and thus government funding.
- Selected to be published in 40th edition of MURJ, the MIT Undergraduate Research Journal

Skills

- Design/CAD: SOLIDWORKS, Fusion 360, 3D printing, FEA, laser-cutting, waterjet
- Heavy & basic shop machinery
- Electronics: Eagle, Pick and Place, Strong Embedded Background
- Programming: Java, C, MATLAB, Arduino, HTML, CSS, JavaScript, OpenCV, LabVIEW, and Python
- Languages: Fluent English & Spanish

Awards and Competitions

2020 Best Undergraduate Researcher @ MIT Mechanical Engineering Research Exhibition

2017 First Robotics Competition Colorado Dean's List Finalist Award