Maxwell Afshar Urbani

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Education

Harvard University, Cambridge, MA - CLASS OF 2022, Bachelor of Arts in Engineering Sciences - Mechanical Engineering and Applied Math.

Work Experience

Lighter Than Air Research and Exploration, Mechanical Engineer (Sept. 2021-Present), Engineering intern (Feb. 2018- Sept. 2021)

Engineering, design, testing, manufacturing, and assembly of a large rigid airship. Some notable projects include:

- Optimized emergency ballast dump from a distributed ballast system. Implemented in C++ with NLP to solve the general case. Individual high speed routine using properties of the pseudo-inverse for the special case where an evenly distributed dump is desired.
- Designed, manufactured and programmed an automated chafe testing machine using sensors to identify cycles of failure for different specimens. Controlled via arduino. Machine capable of loading a specimen up to 1000 lbs, cycling continuously for millions of cycles, and sensing when the specimen fails. Designed and Soldered PCB.
- Engineered and assembled a mobile 10m tall tower and rotation mechanism to secure an even larger rotating structure.
- Automated stage for alignment of assembly parts in 5 axes with less than 1mm tolerance. Faro laser scanner for measurement
- Designed and led installation of airframe walkway system.
- Wrote automated zeroing program for the Shopbot. Program cut out hundreds of hours of manufacturing time.
- Mechanical design for various ground support applications.
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Fung Collaboratives, Redwood City CA, *Public Art Consultant*, Dec. '17 - June. '18

Art curation specialized in realizing public artworks, exhibitions, and events. Worked closely with the Redwood City government to create the Redwood City Master Vision. A plan to create an outdoor museum throughout the City.

TechShop, Redwood City CA, *Dream Consultant*, Oct. 2017- Nov. 2017

Consulted members on the engineering, design, and fabrication of their projects. Operation and maintenance of industrial and CNC machinery.

Extracurricular Activities/Organizations

Harvard MATE ROV Underwater Robotics Team, Cambridge, MA - 2016-2017
CFO, Co-Founder, Mechanical Engineer.

Designed and created a robotic underwater rover to compete in the MATE ROV competition. Created team, Manufacturing plan, frame design, waterproofing. Raised $11,000 for production and travel

Harvard Undergraduate Design Labs, *Founder, Project Manager, Treasurer.*

Coalition of engineers and artists coming together to work on creative projects.

Technical Skills

Experienced in defining engineering challenges and designing, validating, and implementing creative engineering solutions.

Design of large scale manufacturing and assembly methods.

Robotics. Modeling, Kinematics, Motion Planning, Dynamics, Control

Linear Algebra with applications in Image Processing, Data Compression, Page Rank, ODE and PDE,and Machine Learning, Statistics, Calculus.

Linear and Nonlinear Dynamics. System modeling.

Control Theory. Designing controllers including PID and LQR.

Fluid mechanics, Electromagnetism

Electrical Engineering. Circuit Design and Analysis

Programming - C, Matlab & Simulink, Python, Arduino, Javascript, SQL

Algorithm Design.

Rapid Prototyping, 3d printing, CNC fabrication.

Solidworks, FEMAP, AutoCAD

Interests

Using abstract ideas and mathematics to solve problems and design things that function in the real world!