James C. Marwell

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EDUCATION

Lick-Wilmerding High School, current senior**,** GPA 3.98/4.0 *August 2019 – Present*

The School for Ethics and Global Leadership, Washington, D.C., Spring 2022 Cohort *January 2022 – May 2022*

Engineering Courses:

- *Circuits and Electronics*: Electrical engineering course. Design/build projects included: *Rick and Morty* themed **circuit board light, speaker** with an amplifier board, **multi-sensor** circuit board, **alarm clock** based on data from the SF BART api, and an **automated planter**.
- *Design and Technology*: Mechanical and electrical engineering, fabrication and design course. Designed and built a **digital lamp** using metal, wood, and fabric components.

ENGINEERING EXPERIENCE

BETA Technologies, eVTOL Aerospace Company Based in Burlington, Vermont *June 2022 – Present*

- Worked as summer Mechanical Engineering Intern for the Study Hall, Electronics, Manufacturing, and other teams
  - Designed and built multiple physical demos, including a **mock battery demo** and parts of an **inverter demo**. These demos were used to highlight BETA's innovations to investors, school groups, and other educational institutions (such as technology museums). They are also used to teach BETA employees about the technology other teams are working on to cultivate greater company wide understanding of the plane as a whole.
  - Designed, modeled, and fabricated several jigs including **battery cooling tube cleaning and processing jigs** and a **stator welding jig**. Jigs were used to increase efficiency and precision of a given process: cooling tube foreign object debris (FOD) removal, cooling tube sandblasting, and stator wire ultrasonic welding.
  - Designed, modeled, fabricated, and wired various parts for the companies new **battery lift cart** which enables rapid install and destall of the batteries into the plane by one to two people. I worked on a **lift orientation system** to both position and level the cart, using a collection of sensors for distance and location orientation. I also built several safety features including a variety of 3D printed **safety cover plates** to prevent accidental harm to machine or person.
- Transitioned to a virtual role building online interactive demonstrations for the Study Hall team
  - Designed, programmed, and animated a series of virtual demos to exhibit BETA's technologies using Unity, Blender, p5.js, and C#. Demos included: **pulse width modulation**, an **interactive charge map**, **virtual batteries**, **virtual motor**, and an interactive **flight test** .

Nanofabrica, Micro-Additive Manufacturing Company Based in Tel Aviv, Israel *January 2021 – June 2021*

- Designed, modeled, and prototyped **cleaning machine** for DLP post processing.
  - Designed and 3D printed rotating jig that enabled Nanofabrica engineers to test a range of cleaning angles for 3D printed parts. Cleaning machine enables user to mount DLP print bed, set cleaning angle in either of two adjacent cleaning vats and then automatically rotate parts within the cleaning vat.
  - Designed, wired, and programmed a series of buttons, motors, and potentiometers to allow variable speed and total time of the cleaning process, then lock those speeds and times for future use.

Flight Club Aerospace, Independent Aeronautical Engineering Organization *June 2020 – Present*

- 30 person student-run organization designing and building an ultralight airplane. Member of the design, fabrication and administration teams.
- Designed and modeled **rudder control system**, including rudder cable attachment points and rudder pedals; **aileron and elevator control grip**; **fuselage truss**, **wings,** and **battery attachment system.**

Bluestamp Engineering, Engineering Course *July 2020 – August 2020*

- Modeled and built a **robotic arm to play tic-tac-toe** with a human player. Redesigned and 3D printed all non-mechanical parts. Programmed arm servos with a min-max algorithm in C++.

Oxbridge Academic Programs (Intro to Aeronautical, Mechanical, and Electrical Engineering) *July 2019 – August 2019*

- Designed and built a **2ft long glider** to carry a 0.5lb cargo at least 200ft; **small scale bridge** to hold up to 50lbs; and a **small robot** to fight against other robots. 3D modeled and printed parts for robot.

INDEPENDENT 3D DESIGN AND CNC MACHINING EXPERIENCE

Prusa i3 MK3 FDM Printer / Anycubic Photon S DLP Printer, 3D Printing *September 2018 - Present*

- Designed, modeled, prototyped, and 3D printed a **plastic jig** for mounting a **Wi-Fi access point** to an extendable rod so that the connectivity of the access point could be tested in various locations.

- Assembled original **Prusa i3 MK3 FDM and Anycubic Photon S DLP printers**.
- Repaired broken **hotend thermistor and heater block**; worn down **nozzle** and **x-axis belt**; and **hotend**.

Carbide 3D Shapeoko 4 XL / Tormach 770MX CNC Mill, CNC Routing/Milling *July 2021 - Present*

- Designed and modeled custom **Stratocaster electric guitar**. CNC routed guitar body and wired internal electronics. Assembled and finished guitar body, neck, and electronics.
- Assembled **Carbide 3D Shapeoko 4 XL** for personal CNC projects and developed **Tormach 770MX CNC Mill** operating procedures manual for Lick-Wilmerding shops class

SKILLS & INTERESTS

Skills: Blender (500+ hours), Solidworks (300+ hours), Fusion 360 (100+ hours), Rhino (100+ hours), Unity (120+ hours), C#, p5.js, Solidworks CAM, Fusion 360 CAM, Soldering, Design Process, Machining, Python, Eagle
Interests: Historical study, Acting (Various plays), Model United Nations, Debate/Public Speaking, Board Games, Portal video game series

AWARDS & ACCOLADES

V*ancouver Model United Nations 2020*, Best Delegate (1st Place); *Stanford Model United Nations Conference 2020*, Outstanding Delegate (2nd Place); *Vancouver Model United Nations 2021,* Outstanding Delegate (2nd Place)