

Mechanical Engineering Portfolio

Design | Hardware | Prototyping | Analysis

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About Me

Seeking new opportunities as a mechanical engineer

Hello,

I am a mechanical engineer with 4+ years of experience in the aerospace industry, specializing in advanced CAD modeling, finite element analysis, prototyping, and manufacturing processes. My career to date has focused on designing and optimizing components that meet mission driven performance and reliability requirements, while also ensuring efficiency in production and assembly.

I've always been drawn to tinkering and building things whether it's testing ideas, developing prototypes, or refining concepts into working products. This mindset keeps me curious and gives me a practical edge when solving engineering problems.

This portfolio highlights my technical and creative work, including design projects, hands-on prototypes, and product development efforts that demonstrate my ability to solve problems. I am proficient in tools such as SolidWorks, ANSYS, and MATLAB, and have experience collaborating across multidisciplinary teams to deliver results from concept through production.

Currently, I am pursuing an MBA at Babson College, where I am developing a stronger foundation in business strategy and entrepreneurial thinking to complement my engineering skills. My goal is to continue solving complex technical challenges while driving innovation and strategic value in product development.

Thank you for taking the time to review my portfolio. I am eager to contribute to cutting-edge projects and to be part of innovative work like yours.

Sincerely,

Tyler

Core Skills

My go-to engineering superpowers

- Mechanical Hardware Design
- CAD Modeling (SolidWorks, Onshape, NX)
- Design for Manufacturability
- 3D Printing and Fabrication
- Cross-Functional Project Management
- Photography and Videography

Project Portfolio

Some of my recent work that highlight my technical skills.

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3D Printed Camera Lens (Dispo FX)

Developed a 3D-printed lens system for film emulation; planned for market release in 2025

Role: Founder, Product Engineer & Strategy **Years:** 2024 - Present

Project Overview

- Engineered a fully functional, 3D-printed camera lens adapting an acrylic positive meniscus lens from a disposable camera for use with mirrorless camera systems.
- Designed a rotating focus ring with magnetic detents, providing tactile feedback across three focal positions, along with magnetic front and rear lens caps.
- Designed a magnetic accessory to adapt standard 58mm filters to the lens.
- Developed a fully parametric CAD model, enabling rapid scaling and adaptation for different camera systems.
- Performed steady-state thermal and static structural FEA to evaluate temperature and deformation limits under extreme environmental conditions.
- Optimized the design for manufacturability, assembly, and industrial design aesthetics while ensuring mechanical reliability.
- Built and tested iterative prototypes using the Bambu X1C 3D printing platform, establishing an in-house manufacturing process.
- Produced photo and video content (product marketing, tutorials, and sample imagery) to support brand growth and outreach.
- Directed all aspects of early-stage business development, including branding, marketing, supplier management (US and China based), and fulfillment strategy, with a targeted market launch in September 2025.

Links

- Online Store: dispofx.com
- Demonstration Video: youtube.com/watch?v=f35GHAIWMWA
- Samples: instagram.com/dispo_fx

Key Skills

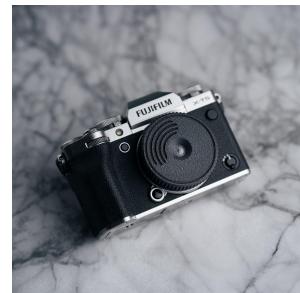
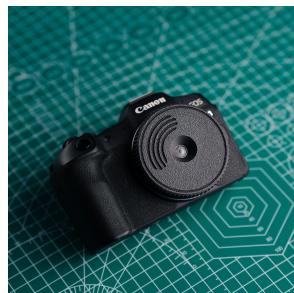
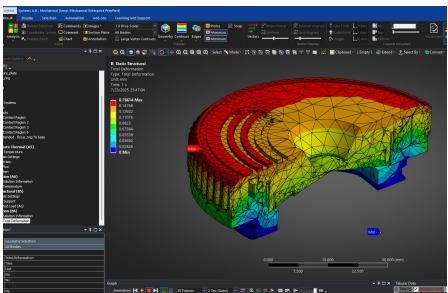
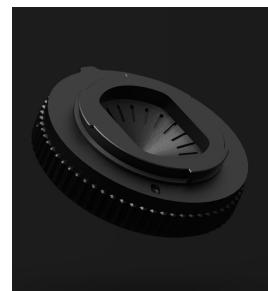
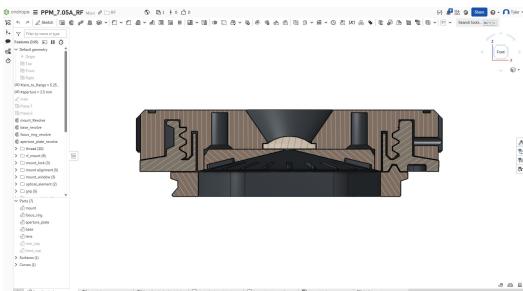
Optics Research
Iterative Design and Testing
DFM and DFA
Branding, Marketing & Business Development
Product Development

Tools

Onshape
Ansys
Notion (Project Management)
3D Printer
Figma (Website UI/UX)
Adobe Lightroom & Photoshop
DaVinci Resolve

Disclaimer

Legitness Labs, LLC, DBA Dispo FX
Dispo FX Lens™ is a proprietary lens developed by Dispo FX™. The unique appearance and design of this product are protected as trade dress. The unique design of this product is the subject of ongoing IP development. © 2025 Dispo FX. All rights reserved. Unauthorized use or reproduction is prohibited.



Electric Skateboard

Designed and built an electric skateboard to get around campus faster (at over 30 mph)

Role: Engineer **Years:** 2018

Project Overview

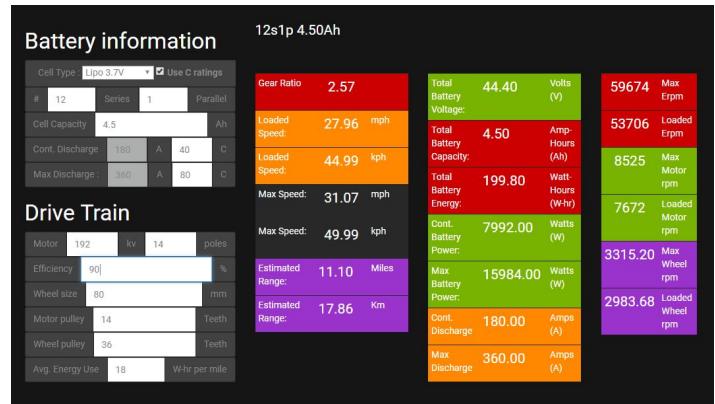
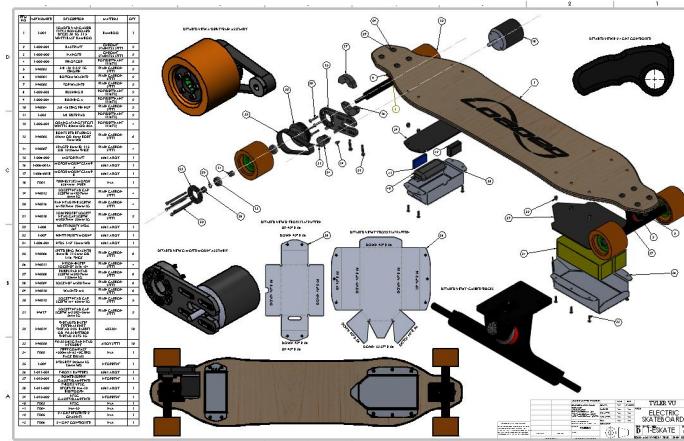
- Powered by a single 6374 (192 kv 2850W 80A) brushless DC motor and two 6S lithium polymer battery packs connected in series.
- User input was controlled via 2.4 ghz controller and receiver.
- Utilized an open source electronic speed controller to manage power delivery to the motor.
- Connected to mobile device via HM-10 bluetooth module to communicate speed, motor temperature, and cell voltage.
- Designed a sheet metal housing to hold and protect all electronics.
- Tested real time top speeds around 30-32 mph on level ground.

Key Skills

Sheet Metal Design
CNC Laser Cutter
CNC Press Brake
Soldering

Tools

SolidWorks (CAD)
Benjamin Vedder VESC



Smart Lighting Remote

Building a remote to run lighting preset functions for WiFi enabled LED lighting

Role: Engineer **Years:** 2026

Project Overview

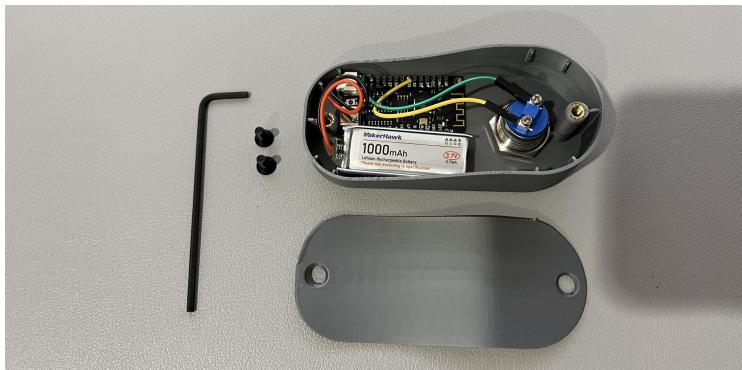
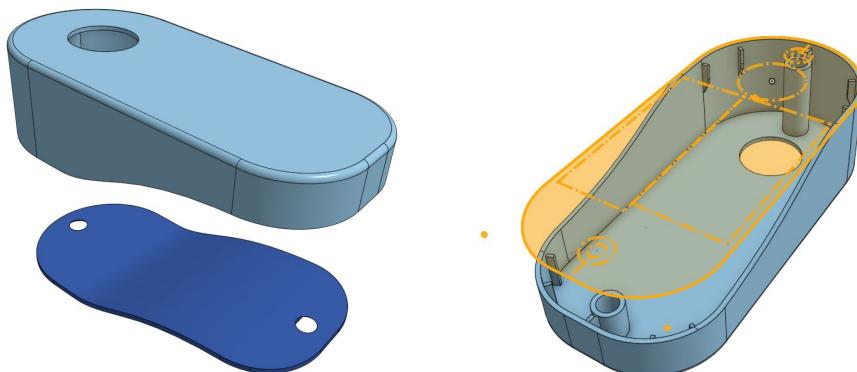
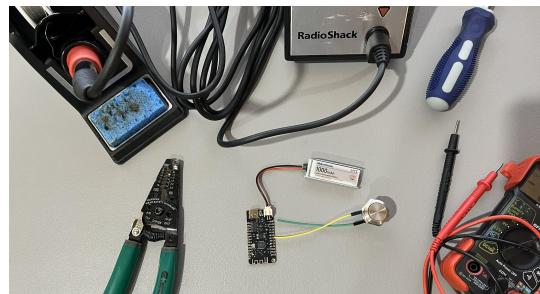
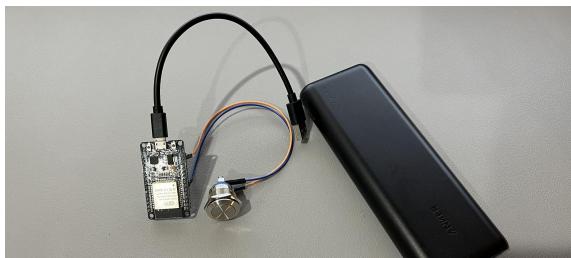
- Flashed MicroPython onto ESP32 to run the microcontroller off of Python for faster development.
- Python script connects to WiFi and makes API requests to set lighting temperature, color, and trigger on/off state.
- Controller stays in light-sleep until button press to conserve power while keeping WiFi connection.
- A single momentary switch toggles lighting presets and turns off lights with a long press.
- Developed on a basic ESP32 dev board and later switched to an board with built in BMS to connect to 1000 mAh LiPo battery for fully wireless interface.
- Future state:
 - Improve case design/packaging for better aesthetics and ergonomics.
 - Add supports to hold board/battery and access to charge/data port from outside of the case.
 - Improve light-sleep functionality for longer duration between charges.

Key Skills

Python/MicroPython
ESP32
Soldering

Tools

Govee API
Fritzing
Onshape
3D Printer
Soldering Iron
Multimeter
Thonny IDE



Contactless Thermometer System

Prototyped a temperature monitor for entryways to screen for COVID symptoms

Role: Engineer **Years:** 2020

Project Overview

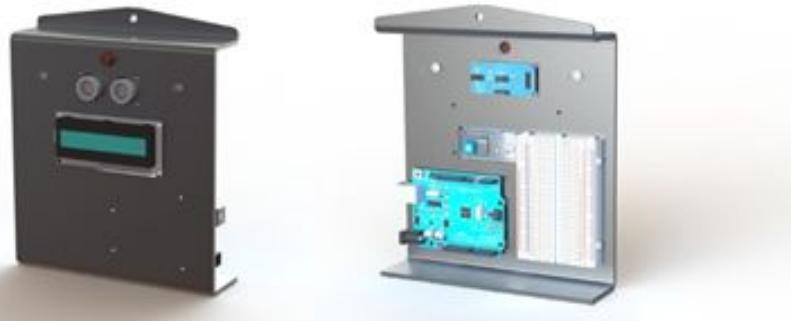
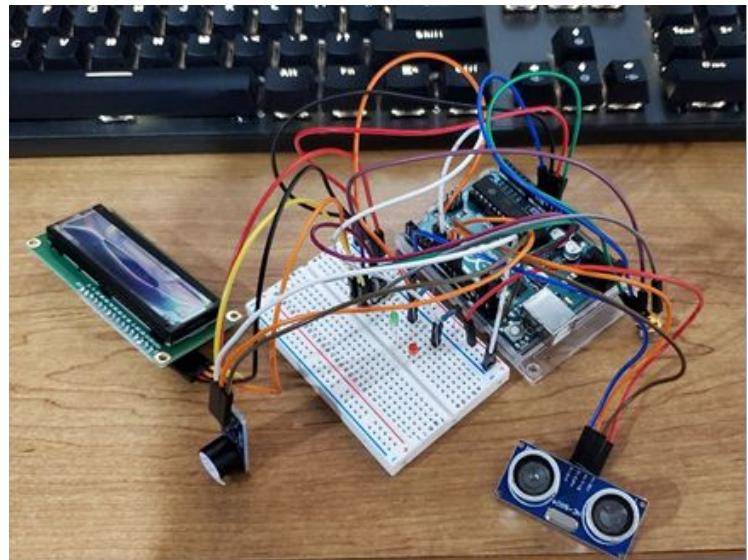
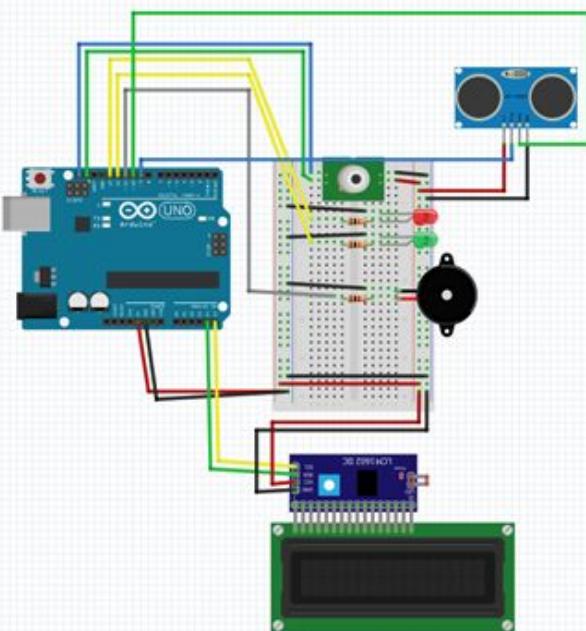
- Designed an Arduino based system as a proof-of-concept for automated screening in public spaces.
- Prototyped an Arduino system that measures and reads subject body temperature with basic non-contact functionality.
- A momentary tactile button starts the program. Then an ultrasonic sensor helps position the subject, an infrared thermometer measures, an LCD displays body temps, and LEDs/buzzer/speaker indicate symptom risk level.
- Created wiring diagrams in Fritzing prior to wiring the system on the breadboard for testing.
- Learned data transfer protocols for I2C bus to control the LCD display.

Key Skills

C++
Arduino
Soldering

Tools

Arduino IDE
Fritzing
SolidWorks (CAD)



Research and Technical Projects

Additional projects that showcase analytical and hands on skills in varying domains

Hybrid Battery Fuel Cell System for Automotive Applications

2021

- Developed a MATLAB tool that calculates fuel cell vehicle's performance on a track based on design parameters for the fuel cell, drivetrain, and hybrid powertrain.
- The tool was designed to aid small-scale vehicle race teams in designing a fuel cell powered electric vehicle.
- Bench tested the characteristics of a fuel cell in our lab to assist the tool development.
- Published Paper: digital.wpi.edu/pdfviewer/wp988n93m



Wind Turbine Optimization

2020

- Performed design analysis and optimization for the low speed shaft and tower for Vesta V52-850 wind turbine.
- Analyzed static failure, buckling, deflection, and fatigue. This included the determination of critical sections as well as corresponding principle stresses.
- Developed a Mathcad objective function to minimize the payback time of the turbine while satisfying the required safety factors against failure.
- Optimization was also calculated in a spreadsheet by manually performing a sensitivity study between the independent dimensions and the outputs.
- The optimized design had the lowest weight and minimal deflection while satisfying the safety factors against failure.
- Analysis Report (Part 1): tinyurl.com/turbine-analysis-report
- Optimization Report (Part 2): tinyurl.com/turbine-optimization-report

Advanced Drying Research

2020

- Undergraduate research assistant to Dr. Jamal Yagoobi (WPI) at the Center for Advanced Research in Drying (CARD).
- CARD researches the drying of porous materials in industries such as food, forestry, chemicals, textiles, and biopharmaceuticals, aiming to drive measurable improvements in global energy conservation.
- Created concept models in SolidWorks to present ideas to suppliers for a modular drying test stand to test drying tech such as reattachment nozzles, ultrasonic drying, electric field drying, and future drying technologies.
- Created layouts and floor plans to optimize ergonomics of custom tools and lab equipment for a new research facility.

2005 Honda S2000 "OEM Plus" Build

2021 - Present

- Restoration and modification of a sports car.
- Performed chemical and mechanical decontamination, 2 stage paint correction, and multiple layers of ceramic coatings.
- Worked with a paint tech to recreate the OEM paint by sampling and analyzing panels in order to paint and install OEM body kit parts.
- Installed an HKS SSM Catback Exhaust, FIPK Intake Kit, Spoon Progressive Springs (on OEM dampers), square wheel/tire setup, steering wheel leather upholstery and more!
- Future plans to install coilovers and forced induction system.



Early Mechanical Design & Robotics

Foundational experience in designing, prototyping, and integrating mechanical systems for competitive robotics

Role: Design Engineer **Years:** 2014-2018

Project Overview

- Some of my earliest mechanical design experience began in the FIRST Robotics Competition, where I gained hands-on exposure to designing and building competition-grade mechanical systems under tight timelines and constraints.
- My work included the design of tank and swerve drivetrains, object manipulation mechanisms, and climbing systems.
- This gave me early exposure to 3D CAD, system-level mechanical design, and CNC-based rapid prototyping.

Key Skills

CNC Laser Cutter
CNC Press Brake
3D Printing
Mill/Lathe
Fabrication/Hand tools

Tools

SolidWorks

