ALEXANDER BRUSH

New York, NY • Phone: 646-771-3561 • Email: a_brush@icloud.com

PROFESSIONAL SUMMARY

Mechanical Engineer with training from MIT and RPI, skilled in product development, DFM, and process optimization. Experienced in cross-functional teams, data-driven problem solving, and improving product reliability.

EDUCATION

Massachusetts Institute of Technology (MIT)
M.Eng – Advanced Manufacturing and Design
GPA: 5.0 / 5.0 | Expected 2025

Rensselaer Polytechnic Institute (RPI)
B.S – Mechanical Engineering
B.S – Design, Innovation, & Society
GPA: 3.86 / 4.0 | 2020-2024

EXPERIENCE

Manta Product Development, Engineering Internship — January 2023-August 2023

- Led design for manufacturability and testing of a medical device, increasing reliability by 51% through rigorous design iteration and feasibility studies.
- Collaborated on robotics and medical device projects under NDA, participating in early product development, rapid prototyping, failure analysis, and performance optimization with a multi-disciplinary engineering team.

Rensselaer Motorsport, Mechanical Engineer — July 2022 - June 2024

- Developed and implemented a custom battery and motor cooling system using FEA simulation to improve thermal stability under high load.
- Performed tire testing and materials analysis using real-world data to inform vehicle setup and maximize performance.

PROJECTS & APPLIED RESEARCH

Optimization of Metal 3D Printer Utilization – Partnered with Physical Sciences Inc. — Fall 2024

- Developed a Python-based buffer size simulation to optimize throughput and utilization of a Nikon SLM printer.
- Modeled post-processing machine line (SLM, band saw, mill) as unreliable with buffers; simulated workflows to recommend ideal buffer sizes.
- Improved projected utilization from ~20% to ~50% through simulation, job scheduling, and inventory strategy.
- Created deliverables including SOPs, live spreadsheets, and simulation tools for PSI implementation.

RC Car Manufacturing – Steering System Design — Fall 2024

- Designed and built the steering subsystem for a batch of 40 remote-controlled cars; created jigs and optimized production layout to streamline assembly and reduce manufacturing time.
- Led fabrication and testing of components, ensuring performance and consistency across units within a collaborative, fast-paced build environment.

Fiber Extrusion Device (FrED) Control & DoE — Fall 2024

- Designed and implemented a PID-controlled temperature system to stabilize extrusion output.
- Conducted a Design of Experiments (DoE) to model effects of temperature, material, and speed on diameter.
- Integrated real-time Statistical Process Control (SPC) into a live dashboard for process monitoring and predictive feedback.

Advanced Drone Delivery and Recovery — Spring 2021

- Designed a system for launching and recovering an unmanned aerial vehicle by submarine.
- Filed a U.S. provisional patent application (No, 104916-100) to protect intellectual property.

SKILLS

Technical: Solidworks, NX, Rhino, Python, MATLAB, Machining, 3D Printing, Woodworking
Interpersonal: Collaboration, Technical Communication, Risk Mitigation, Leadership, Agile Workflow

LEADERSHIP & ACTIVITIES

RPI eSports, Manager — August 2020 - June 2024

- Managed and coached two competitive teams, winning NACE Starleague title; developed team strategy and handled recruitment.
- Led event planning and new member onboarding, growing club participation across campus.