Daniel T. Simpson

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Education

Northeastern University – College of Engineering, Boston, MA   **May 2024**

Bachelor of Science in Mechanical Engineering with Minor in Mathematics   **GPA: 3.90**

Achievements: Dean's List, Dean's Scholarship, Honors College, **Summa Cum Laude**

Coursework: Systems Analysis & Control, Mechanical Engineering Design, Computational Fluid Dynamics, Electrical Engineering, Assistive Robotics, Heat Transfer, Materials Science, Statistics & Stochastic Processes

Skills

Applications: SolidWorks (CSWA), OnShape, ANSYS Fluent, SolidWorks CFD & FEA Simulations, SolidWorks PDM

Fabrication: FDM & SLA 3D Printing, Laser Cutting, Water Jetting, 3-Axis Milling

Analysis: GD&T, MATLAB, Python, Linear Regression, ANOVAs, Design of Experiments

Languages: English, Polish (Conversational)

Experience

Hydrilla Hunters – *Senior Capstone Team Project*   **June – December 2023**

- Created an ArduPilot-based USV for autonomous GPS waypoint missions and remote ground station control
- Managed propulsion tasks, timelines, and CAD PDMs and delegated component specifications across teams
- Analyzed outdoor lake test data logs to extract boat energy efficiency and identify points of improvement
- Executed SolidWorks and ANSYS CFD simulations to select thrusters and optimize nosecone design
- Designed a buoyancy calculator to predict the boat's waterline for a given hull shape and payload size
- Featured in several articles including News@Northeastern, The Robot Report, GovTech, & Hartford Courant

AerospaceNU Club – Unmanned Aerial Vehicles –*Project Lead*   **September 2020 – September 2023**

- Led the SolidWorks modeling and manufacturing of a laser-cut, vibration-dampened camera gimbal
- Independently designed, built, and tested an autonomous sUAS for compact indoor environments
- Headed the research team to develop tethered UAVs that perform midflight LiPo hot swaps
- Justified budget expenditures and assembly design by analyzing drone accelerometer data from flight tests
- Applied a design of experiments to optimize waterjet settings for 2mm thick carbon fiber plates
- Created actuation systems and 3D-printable joints for a unique dodeca-copter that carried six quadcopters

Amazon Robotics – *Hardware Development Co-op*   **January – June 2023**

- Automated tote stopping on conveyors for multi-day experiments using PLC ladder logic programs
- Originated Python scripts to parse through tote position data and visualize patterns over distance and time
- Performed linear regression and ANOVAs to assess how tote speeds, weight, and types impacted stopping
- Authored procedures and troubleshooting steps that others used to automate containerized storage tests
- Engineered workcell safeguarding in accordance with ASME B15.1 human safety and ergonomic standards
- Conceptualized a 3-DoF delta robot assembly and calculated its working volume constraints in SolidWorks
- Justified production-level expenditures by measuring photo-eye responsiveness on conveyor systems.
- Tested RealSense depth camera accuracies to verify its failsafe detection capabilities in workcells

Desktop Metal – *Mechanical Engineering Co-op*   **January – June 2022**

- Created SolidWorks part drawings and justified dimensions by specifying GD&T and tolerance stack-ups
- Performed SolidWorks FEA simulations and bolt assembly hand calculations to validate part-design
- Fabricated aluminum hard stops for a custom 300 kg-capacity forklift to prevent damage to other machines

MIT BeaverWorks Summer Institute – 6-Week Autonomous UAV Racing Course – *Student*   **July – August 2019**
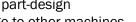
- Programmed drones using OpenCV and linear regression in Python to autonomously follow LED light paths
- Implemented ArUco marker identification for obstacle avoidance and optical flow for drone position stability
- Team optimized PID values to achieve one of the fastest autonomous flights in the class

Fun Items: Skis recreationally; Loves rock climbing; Raced FPV drones