Nathan Ma

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Skills

Software: SolidWorks, Siemens NX, AutoCAD, Fusion 360, Microsoft 365 Suite, Google Workspace

Documentation: Mechanical Engineering Drawings, Technical Report Writing, Basic GD&T

Fabrication: Machining, 3D Printing, Laser Cutting, Soldering

Languages: Python, C++, MATLAB, Arduino, RobotC, LaTeX

Projects

Two-Axis Robotic Arm | *SolidWorks, Arduino, 3D-Printing*

- Created **SolidWorks** part models and assemblies from concept sketches and **freehand** part drawings
- **3D-printed** robotic arm parts with **fitments and tolerances** in mind for rigidity
- Integrated LED diodes into the end-effector to provide illumination
- Programmed an **Arduino** to control servos via a joystick interface for intuitive user operation

Water Rocket Parachute Deployment Device | *SolidWorks, 3D-Printing*

- Designed a nose cone attachment in **SolidWorks** to enable parachute deployment at peak flight altitude
- Developed a **timer mechanism** using a toy timer and calibrated based on rocket flight testing to ensure timely parachute deployment

Upcycled Brushed DC Motor | *Soldering*

- Constructed a brushed DC motor using **upcycled materials**, including a commutator made from aluminum foil and cylindrical plastic packaging, and wooden chopstick axle
- Wound enameled copper wire into a coil, and stripped and **soldered** it to the commutator
- Assessed electrical continuity of soldered connections and the circuit overall with a multimeter
- Assembled the motor within a cardboard chassis, using neodymium magnets and bearings for strong and reliable motor operation

Experience

UW Alternative Fuels Team | *SDI Team Member* Jan 2025 - Present

- Improved the design and functionality of the fire extinguisher mount for **enhanced safety and accessibility** in case of emergency during operation
- Created detailed 3D models and assemblies in **Siemens NX** to improve part fitment and reduce assembly time during prototyping

UW Formula Electric | *Suspension Subteam Member* Sep 2024 - Present

- **Interpreted technical drawings** to fabricate a spacer for the suspension system
- Operated **lathe**, **drill press**, and **milling machine** to manufacture precision parts

VEX Robotics | *Builder* Sep 2022 – Jun 2024

- Designed a triball intake mechanism to meet the robot's dimensional constraints, **optimizing** both space and functionality
- Tested the intake system, **reiterating** and **fine-tuning** the design to ensure high reliability and durability during competitions

Education

University of Waterloo Sep 2024 - Present

Bachelor of Applied Science, Mechanical Engineering

- Cumulative GPA: 3.9 (91%)
- President's Scholarship of Distinction