Camilo Artigas

(647) 836-0531 | cartigas@uwaterloo.ca

Dual Canadian & US Citizen

Website | LinkedIn | GitHub

Skills

Mechanical: Solidworks (CSWA), GD&T, DFMA, 3D Printing, Machining, Root Cause Analysis, Actuators
Software: Python, C++, Arduino, MATLAB, Git, Ubuntu, NumPy, Matplotlib
Electrical / Controls: Circuit Analysis/Design, Soldering, Harnessing, Crimping, Stepper and Servo Motors, Sensors

Experience

Sensor Hardware Engineering Intern — May 2025 – Aug. 2025

Kodiak Robotics — *Mountain View, CA*

- Designed and prototyped a liquid and air sensor cleaning system with 12+ nozzles, optimizing pressure and angle for LIDAR, WFOV, and NFOV cameras — ensuring reliable perception for fully autonomous trucks.
- Designed and brought up a modular sensor cleaning test bench, integrating an in-house PCB with Python and C++ automation scripts to enable repeatable, plug-and-play validation across multiple sensors, reducing setup time by 70%.
- Modified and integrated a sheet metal enclosure in SolidWorks to house pneumatics for the air cleaning system, applying DFA principles to reduce on-road troubleshooting time by 30% and personally mounting the full assembly onto the truck.
- Validated full cleaning system performance by capturing synchronized images and LiDAR PCAPs during operation, quantifying cleaning effectiveness across all autonomous truck sensors.

Mechatronics Engineering Intern — Sep. 2024 – Dec. 2024

Sheartak Tools Ltd. — *Waterloo, ON*

- 3D modelled 10+ spiral cutterheads in SolidWorks, drafting technical drawings using GD&T and to ensure all critical tolerances were met.
- Developed Python scripts with OpenPyXL and NumPy to automate the migration of 500+ products to a new website, saving 30+ hours.
- Performed 6 cutterhead installations on planers and jointers in less than 7 hours, installing 50+ carbide blades per cutterhead while prioritizing safety at all times.
- Optimized the cutterhead installation time of 20+ customers by drafting 5 detailed installation manuals.

Mechanical Lead & Designer — Aug. 2024 – Present

Waterloo Aerial Robotics Group — *Waterloo, ON*

- Led the design of the drone's landing gear in SolidWorks for the 2025 competition, angling its legs to ensure concentricity with bucket for water retrieval; implementing depth limiters, anti-tipping bars and carbon fiber members.
- Optimized main drone assembly in PDM by implementing parametric modelling, allowing team members to change the parameters in real time, saving 10+ hours.
- Designed mount for an optical flow sensor, CV and IR camera, aligning them with the drone's direction of flight, saving weight and eliminating all vibrations.
- Designed an air speed sensor mount, leveraging Ansys CFD to optimize placement for improved measurement accuracy.

Projects

Cycloidal Actuator | *SolidWorks, 3D Printing, DFMA, Python, Stepper Motors* — **July 2024 - Present**

- Designed 130+ part assembly in SolidWorks, achieving a gear ratio of 23:1 with cycloidal speed reducer.
- Developed Python script that outputs instant visualization of the cycloid, reducing modelling time by 20%.
- 3D printed a backlash free functional prototype, projected to machine all parts after testing torque.

3-DOF Robotic Arm | *SolidWorks, 3D Printing, DFMA, Python, Arduino, Servo Motors* — **Apr. 2024 - July 2024**

- 3D printed the robot with tight tolerances by iteratively designing it in SolidWorks and employing DFMA.
- Achieved smooth movement in the x, y and z axes by deriving the arm's inverse kinematics and implementing ramp libraries. This was facilitated by the use of 3 servo motors and 2 four-bar linkages.
- Established serial communication between Python GUI and Arduino IDE, achieving precise movement within workspace.

Education

University of Waterloo — Sep. 2023 – Present

Candidate for a Bachelor of Applied Science in Mechatronics Engineering — *Waterloo, ON*

Relevant Coursework: Mechanics of Materials, Sensors & Instrumentation, Data Structures and Algorithms, Materials Science, Calculus III

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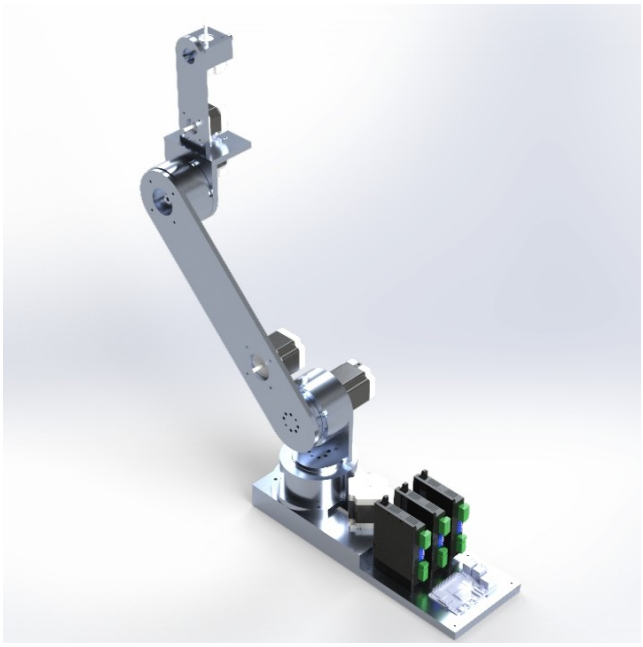
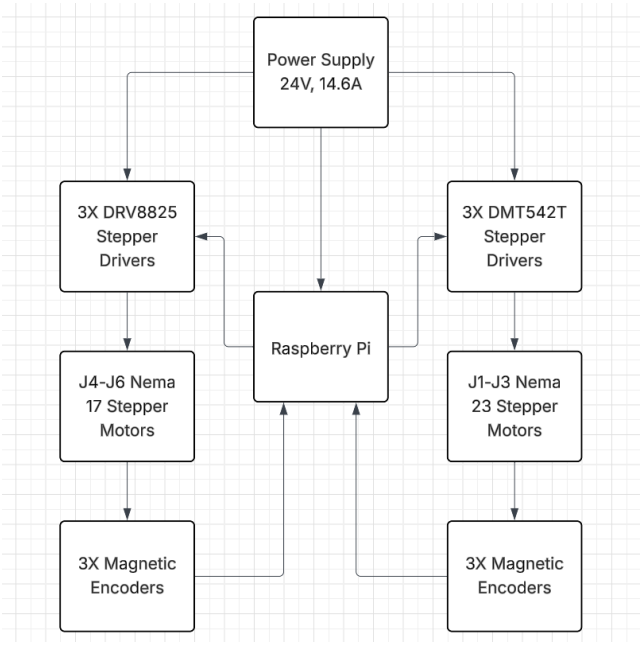
6-DOF Robotic Arm

Designing a 6-DOF Robotic Arm capable of a 3 kg payload, integrating my own gearboxes, stepper motors, machined parts and inverse kinematics. Projected to begin manufacturing in Oct 2025.



SolidWorks Model



High Level Architecture

Sensor Cleaning @ Kodiak

Designed and prototyped a liquid and air sensor cleaning system optimizing pressure and angle for a LiDAR and WFOV/NFOV cameras. Actuated it by bringing up a modular sensor cleaning test bench, integrating an in-house PCB with Python and C++ automation scripts. Validated full system by capturing synchronized images and LiDAR PCAPs during operation.

Kodiak Commercial Sensor Pod Assembly

Sensors in cleaning system: WFOV, NFOV Cameras and OT-128 LiDAR

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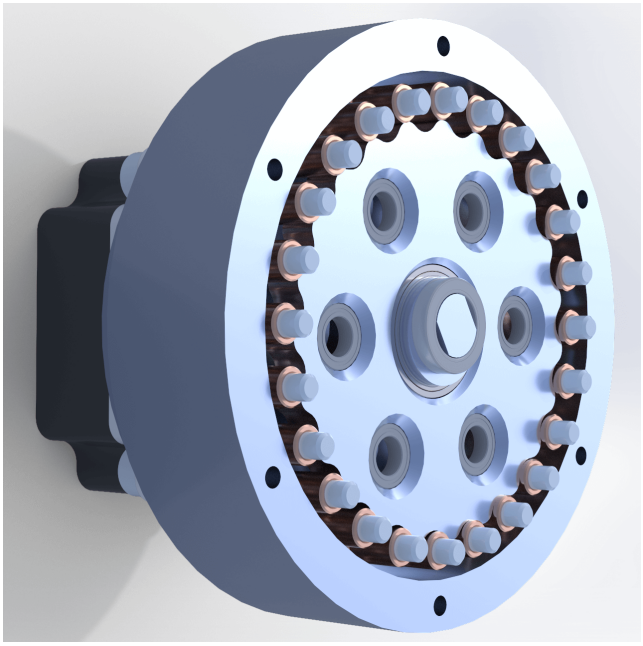
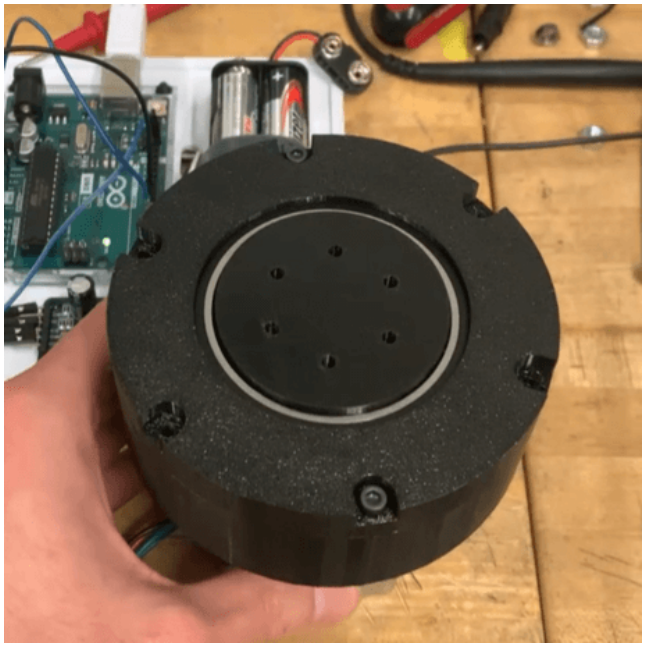
Cycloidal Actuator

Designed a 130+ part assembly achieving a gear ratio of 23:1 using a cycloidal speed reducer. Developed a Python script for instant visualization of the cycloid, reducing design time by 50%. Successfully 3D printed a backlash-free prototype. (Code)



SolidWorks Model



Functional Prototype → WATCH HERE

Angled Landing Gear @ WARG

Designed landing gear tailored towards WARG's competition challenge: water retrieval by landing on a barrel. Implemented parametric modelling, saving 10 hours. Added key features such as: optimal angle, anti-tipping bars and depth limiters. The landing gear was successful every time it was tested.

SolidWorks Overview

Landing Gear in Action → WATCH HERE

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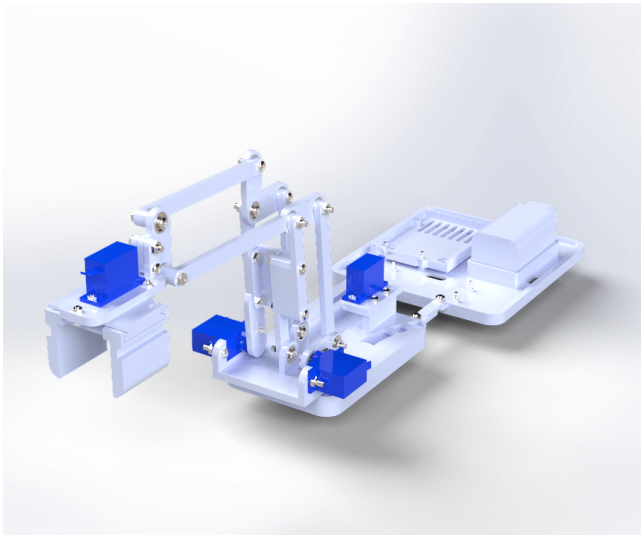
3-DOF Robotic Arm

Designed and programmed a robotic arm by deriving its inverse kinematics, achieving smooth movement along the x, y, and z axes using servo motors. Established serial communication between a Python GUI and Arduino IDE for precise control. (Code)

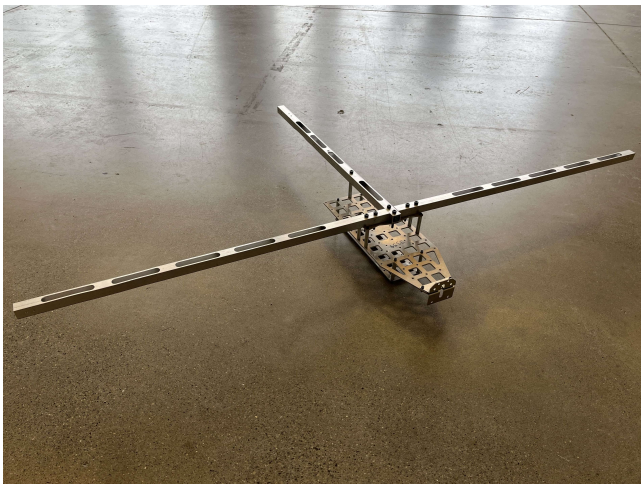


SolidWorks Model

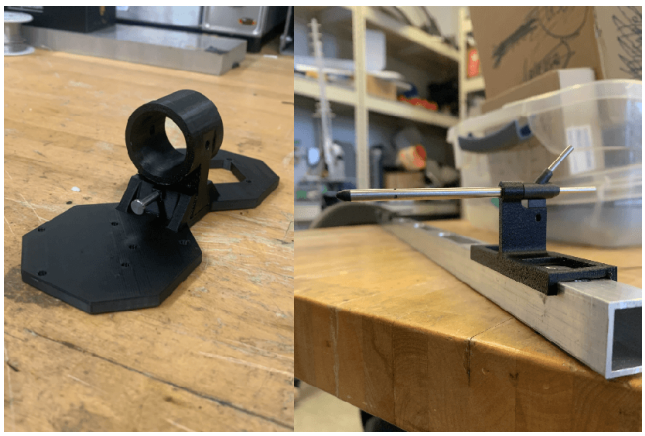
Robotic Arm Controlled with GUI → WATCH HERE

Manufacturing & Prototyping @ WARG

Led the manufacturing of a fixed wing aircraft at WARG, using mills, lathes and 3D printing. I also had the opportunity to design weight-saving, vibration-free sensor mounts such as an air speed sensor mount and a mount containing an OFS, IR and CV Camera.



Fixed Wing Frame



Monster Mount & Air Speed Sensor Mount

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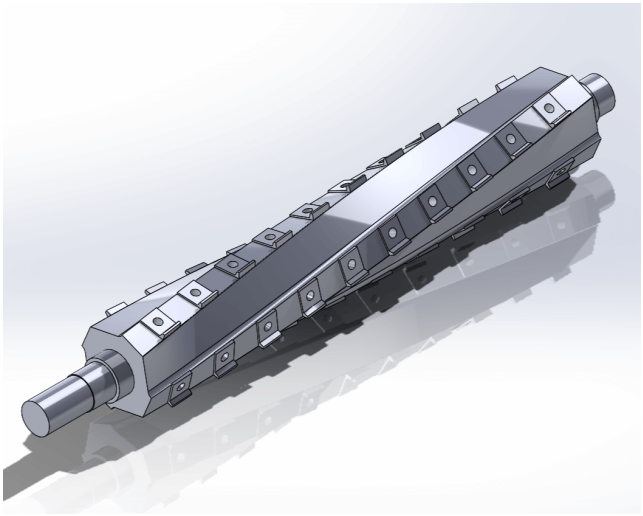
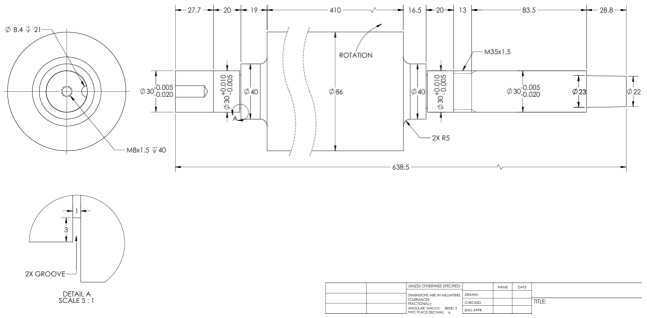
GD&T and Modelling @ Sheartak

During my internship at Sheartak, I had the opportunity to model several spiral cutterheads, creating their engineering drawings while capturing key features and tolerances.



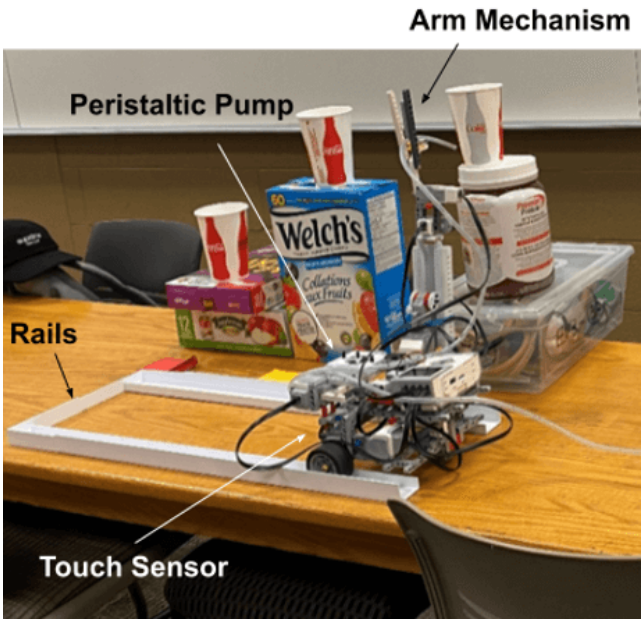
Spiral Cutterhead Solidworks Model



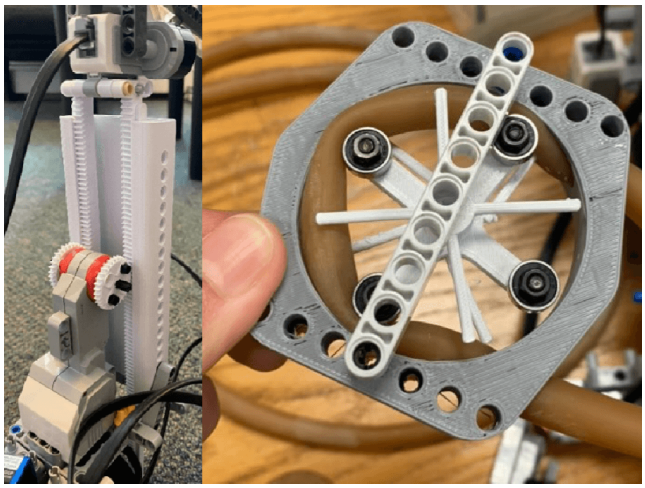
Engineering Drawing

Autonomous Plant Watering Robot

Designed a 3D-printed peristaltic pump with 20% occlusion, capable of watering 6 plants in under a minute. Built a rack-and-pinion mechanism to convert rotational motion into linear movement for lifting hoses. Achieved full autonomy by integrating an ultrasonic sensor, motor encoders, and C++ scripts.



Robot Watering Plant



Rack and Pinion Mechanism & Peristaltic Pump