Ryan Wang

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Skills

Mechanical: SolidWorks (CSWP), AutoCAD, Fusion 360, Onshape, DFMA, GD&T/Technical Drawings, 3D Printing
Software: C++, Python, Java, JavaScript/TypeScript, HTML/CSS, Next.js, Node.js, Flask, MATLAB
Robotics: ROS 2, OpenCV, Odometry, PID, Path Planning (A*, Pure Pursuit)
Embedded: ESP32, Arduino, Raspberry Pi, Servo/Stepper Motors
Tools: Docker, Linux, Git, GitHub, VS Code

Education

University of Waterloo   **Sept 2025 – Present**
BASc in Mechatronics Engineering, GPA: 4.0/4.0   *Waterloo, Ontario*

Experience

Software Engineer   **Dec 2025 – Present**
WATonomous   *Waterloo, ON*
- Built a ROS 2 autonomous navigation stack in C++ on Linux; generated LiDAR-based occupancy grids/costmaps and integrated A* planning with Pure Pursuit control to achieve end-to-end self-driving on a simulated vehicle.
- Designed and tuned a PID controller for a Mars rover; implemented adaptive speed reduction to improve path tracking.
- Built a URDF model with STL meshes for Foxglove visualization; calibrated a Gazebo physics simulation to better match real rover properties.

Mechanical Engineer, Team Lead   **Sept 2022 – June 2025**
Churchill Robotics   *Calgary, AB*
- Led mechanical design for V5RC teams (3388N, 3388C); won 2024 Alberta Provincial Championship, competed at World Championship, and ranked 11th at Canada's largest robotics tournament.
- Designed and fabricated mechanisms (pneumatics, gearboxes, flywheels, PTO); machined custom polycarbonate and acetal parts for competition robots.
- Developed autonomous routines in C++ using PID, odometry, and Pure Pursuit; deployed reliably at competitions.
- Maintained 300+ pages of engineering documentation and mentored 15+ junior members.

Projects

Anthropomorphic Robot Hand | *SolidWorks, Arduino, ESP32, C++, Python, OpenCV*   **Dec 2025 – Jan 2026**
- Designed a human-proportioned robotic hand in SolidWorks, using configurations to generate multiple finger variants.
- Validated range of motion and interference in assemblies with evaluation tools; applied tolerance and DFM principles to improve 3D-printed joint performance.
- Developing a 5-DOF actuation system using Arduino Nano + ESP32 + PCA9685 servo shields; integrating OpenCV-based hand tracking to map real hand motion to robot motion.

Smart Home Sensor Network | *SolidWorks, ESP32, C++, Python, Flask, Raspberry Pi*   **Nov 2025 – Dec 2025**
- Built an ESP32 sensor network streaming room data to a Raspberry Pi hub; validated data within ±1°C and ±5% RH.
- Implemented a Flask REST API to receive, store, and process telemetry; sustained 1000+ data points/hour.
- Designed tolerance-driven enclosures in SolidWorks; iterated 4 revisions for cable routing, airflow, fit, and aesthetics.

Card Analysis/Dispensing Robot | *C++, Sensors, PID*   **Sept 2025 – Nov 2025**
- Designed a VEX-based robot that deals a customizable number of cards to automate card games.
- Developed a dispenser over 4 iterations, achieving ~99.5% single-card success (about 1 misdeal per 200 deals).
- Built C++ software using 5 input sources and PID; able to sort cards with ~99% accuracy and built a modular UI.
- Implemented a custom randomized dealing-path algorithm to simulate card shuffling through software.

Leadership

Chief Technology Officer & Instructor   **Aug 2023 – Aug 2025**
Youth Digital Talent   *Calgary, Alberta*
- Partnered with local organizations (e.g., GLOCAL, PIA Calgary) to provide software solutions and teach digital skills.
- Created lesson plans and taught 50+ students C++, Unity, and UI/UX while coordinating volunteers and logistics.

Awards

- 1× Hackathon 1st Place; 2× V5RC Tournament Champion; 1× V5RC Excellence Award