Robert Vigneron

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Education

University of Waterloo Sept 2025 – Present
B.A.Sc in Mechatronics Engineering

- President's Scholarship (90%+, $2000), FPGA workshop, FEA Ansys workshop

Skills

- **Design & Analysis:** SolidWorks, Onshape, Fusion360, AutoCAD, Excel, Microsoft 365, Ansys, FEA, GD&T
- **Software:** Python, SQL, C++, C, Java, HTML, CSS, JavaScript, Git, SVN, Arduino IDE
- **Manufacturing:** Mill, Lathe, CNC, 3D Printing, Bandsaw, Drill Press, Power Tools
- **Other:** G Class Driver's License, French (DELF B2 Certification), Canadian Citizenship

Experience

Network Infrastructure Intern | *Nokia* July 2024 – August 2024

- Independently researched methods of **statistically analyzing** packet sequences, using **PCA Dimensionality Reduction** to compress complex data sets of 100k+ entries while preserving shape using **Python** and **Matplotlib**
- Collected experimental runtime data using **SQL** and **Python** for 4 **Statistical Distance Metrics** to select the most efficient metric to robustly measure how similar packet sequences were to a control datset
- Professionally demonstrated and defended a packet sequence analysis tool created within 4 weeks

Driveline Member | *University of Waterloo Formula Electric (FSAE)* September 2025 – Present

- Designed a static test bench in **SolidWorks** to evaluate a custom salisbury limited-slip differential's coefficients of friction, breakaway torque, and torque bias ratios to make justified design choices
- Created 20+ **Engineering Drawings** for manual machining, applying GD&T and understanding of tolerances
- **Manufactured** 20+ 2026 vehicle components within the appropriate tolerance and factor of safety

Mechanical Team Lead | *Spark Youth Robotics (FRC 8729)* June 2023 – May 2025

- Taught 50 members general engineering knowledge, Onshape and SolidWorks, and safe use of power tools
- Led design and manufacturing meetings, resulting in a **100% increase** in member applications the next season
- **Prototyped** and **manufactured** 3 multi-mechanism robots using power tools, **CNC parts**, and aluminum extrusions which competed in 8 FIRST Robotics competitions, resulting in 2 provincial finalist placements
- Created a full **CAD** and bill of materials for the 2025 robot's custom elevator, intake, claw, and drivetrain
- Iterated designs using **root-cause analysis** efficiently, finalizing the robot within 10 weeks

Mechanical & Electrical Member | *Spark Youth Robotics (FRC 8729)* June 2022 – May 2023

- Designed a rotating 3-stage telescoping arm in **SolidWorks** with a pneumatic claw and custom 1:70 gearbox
- Designed an electrical box in SolidWorks to enclose robot components while allowing for easy maintenance

Projects

Rubik's Skewb Solving Robot | *Solidworks, 3D Printing, C++* Oct 2025 – Dec 2025

- Devised a method to **autonomously** reach any cube state using only 4 motors
- Created a full **CAD** in **SolidWorks** including custom 3D-printed parts and imported standard parts
- Created and tuned a function to precisely and quickly rotate corners 90 degrees using PIDs

Paragon – Python Video Game | *Python, Git, OOP* Jan 2024 - July 2024

- Developed an educational story game using **Pygame** in **Python** with customizable learning goals
- Implemented obstacle collisions and interactions in a 2D player-centered custom world

Arduino Binary Counter | *Arduino IDE, breadboarding, C++* Aug 2025 - Aug 2025

- Wired and programmed a counter with up and down buttons which displays a 4-digit binary sequence on LEDs