

Robert Vigneron

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Education

BASc in Mechatronics Engineering | *University of Waterloo*

GPA: 4.0/4.0

- President's Scholarship (\$2000), FPGA workshop, FEA Ansys workshop

Experience

Mechanical Engineering Co-op | *University of Waterloo Formula Electric (FSAE)*

January 2026 – Present

- Designed a test bench and testing procedures to characterize the team's custom limited-slip differential, experimentally collecting torque-bias ratios and breakaway torque for precise customization
- Owned a modular push bar/rear jack for a 500lbs+ racecar with increased usability and additional features, iteratively performing FEA to validate safety factors and durability across multiple vehicles
- Performed layup and mould design of a carbon fiber radiator fan shroud, reducing material waste by 19%

Driveline & Tractive Member | *University of Waterloo Formula Electric (FSAE)*

September 2025 – December 2025

- Created 20+ Engineering Drawings, applying GD&T and tolerancing, reducing manufacturing errors by 34%
- Manufactured 20+ 2026 vehicle spacers, mounts, and testing components to 0.1mm tolerances
- Characterized 600+ battery cells with DCIR, ACIR, and natural discharge testing, reducing time to test by 50%

Network Infrastructure Intern | *Nokia*

July 2024 – August 2024


- Independently researched statistical methods for packet sequence analysis, selectively applying PCA, LSD, and KLD to compress 100k+ entry datasets while preserving structural features using Python
- Automated the collection of runtime data using SQL and Python for 6 Statistical Distance Metrics in order to select the most efficient metric of comparing packet sequences, saving 40+ hours
- Professionally demonstrated and defended a packet sequence analysis tool created within 4 weeks

Mechanical Team Lead | *Spark Youth Robotics (FRC 8729)*

June 2023 – May 2025

- Led robot design for 3 years, guiding the team to it's first worlds qualification and 2 provincial finalist titles
- Created a full CAD and BOM for 3 complex robots, including custom elevator, intake, and drivetrain mechanisms
- Led design and manufacturing meetings, resulting in a 115% increase in member applications over 2 years

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 8 independent functions to precisely and quickly rotate corners 90 degrees using PIDs

Duosingo - Language Learning Application  | *Python, Git, APIs, AI*

Jan 2026 - Jan 2026

- Performed phonetic comparison using a pre-trained AI model to evaluate user performance and provide feedback
- Developed a fully autonomous translated lyric video generator using ElevenLabs and Gemini API

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

Skills

- **Design & Analysis:** SolidWorks, Matlab, 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, Carbon Fibre Vacuum Infusion, Bandsaw, Drill Press, Power Tools
- **Other:** G Class Driver's License, French (DELFB2 Certification), Canadian Citizenship