

# Robert Vigneron

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## Skills


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- **Design & Analysis:** SolidWorks, MATLAB, Ansys, SVN (PDM), AutoCAD, Microsoft 365, FEA, GD&T, DFMA
- **Manufacturing:** Mill, Lathe, Waterjet (ProtoMAX software), TIG Welding, 3D Printing, Composites, Power Tools
- **Software:** Python, SQL, C++, C, Java, HTML, CSS, Git, Arduino IDE


## Experience

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**Senior Driveline Member & Safety Captain** | *UW Formula Electric (FSAE)* May 2026 – Present

- Designed a static differential test bench  in SolidWorks, manufactured all parts, and conducted tests to collect the breakaway torque, preload, and coefficients of friction for the team's custom limited-slip differential
- Used experimental data for preload and friction coefficients to calculate the differential's torque-bias ratio

**Mechanical Engineering Co-op** | *UW Formula Electric (FSAE)* January 2026 – April 2026

- Owned the team's push bar/rear jack  for a 500lbs+ racecar using feedback from previous iterations, improving ergonomics, modularity for transport, stand-alone stability, and fire extinguisher accessibility.
- Iteratively performed FEA and mesh refinement on the push bar/rear jack in Ansys Workbench & Mechanical
- Manufactured 100+ vehicle components including custom differential mounts to 0.05mm tolerances on the mill, drilled safety wire bolts, custom conical washers on the lathe, and waterjetted busbars
- Redesigned the radiator mounting system to work with 3 different radiators and reduce unfixed mass by 15%
- Applied DFMA to develop the mould for a carbon fibre fan shroud, then performed its layup and post-processing
- Used RCA to rework a 9-part aluminum firewall system on the fly to be functional and rules compliant despite initial design errors within 24 hours while maintaining its strength, seal quality, and servicability

**Battery & Driveline Member** | *UW Formula Electric (FSAE)* September 2025 – December 2025

- Manufactured a mock battery segment to test airflow to 84 cylindrical cells and test-fit components, including the rework of an air-tight segment container and lid, reducing time to access segment by 60%
- Disassembled and reassembled 100+ 2025 mechanical components, evaluating points of wear to predict failures
- Created 20+ Engineering Drawings, applying GD&T and DFM to reduce manufacturing errors by 34%

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


- Independently researched statistical methods for packet sequence analysis, selectively applying PCA, LSD, and KLD to reduce dimensionality of 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 of manual testing

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


- Led a team of 40+ students through robot design for 3 years, guiding the team to 2 provincial finalist titles
- Created a full CAD and BOM in SolidWorks for 3 FRC robots, including elevator, intake, and drivetrain systems
- Led design and manufacturing meetings, resulting in a 115% increase in member applications over 2 years

## Projects

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

- Designed a full CAD in SolidWorks with custom 3D-printed parts and imported standard VEX Robotics parts
- Wrote startup and shutdown procedures, using 3 physical inputs to validate safe conditions

**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

## Education

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**BASc in Mechatronics Engineering** | *University of Waterloo*

GPA: 4.0/4.0