

SUMMARY OF QUALIFICATIONS

EMBEDDED SOFTWARE Work experience with programming FPGAs using VHDL. Wrote an RTOS.

LAB EQUIPMENT Familiarity with lab equipment including oscilloscopes, signal generators, and spectrum analyzers.

PROTOTYPING Hands-on experience, including circuit design, audio and video, power electronics, motor control, and troubleshooting. See: [watercolor robot](#), [RC car collision avoidance](#)

ELECTRONICS Circuit design and PCB layout in Eagle. Hand soldering and reflow soldering.

CERTIFICATIONS Amateur Radio Operator Certificate (VE6RKH).

MECHANICAL CAD Experience using AutoCAD, SolidWorks, OpenSCAD.

MACHINE SHOP Prototyping using CNC mill, lathe, bandsaw, laser cutter, and 3D printer.

PRODUCT DESIGN Many products built from scratch, including [3draw](#), [modelcraft](#), and [babelfish](#).

MECHANICAL DESIGN Knowledge of mechanical engineering analysis from classwork, including static analysis, machine elements and finite element analysis theory.

SOFTWARE Python, C++, C, Arduino, LabView.

COMMUNICATION Hack The North organizer in charge of hardware, director of Maker Club.

EDUCATION

BACHELOR OF MECHATRONICS ENGINEERING | University of Waterloo | 3A | 2016 - 2021

EXPERIENCE

GOOGLE | Software Engineering Intern | Python, C++, and JavaScript
May 2018 - August 2018 | Mountain View, USA

- Wrote embedded and server-side code for Google Assistant's Smart Display product
- Built a prototype integration of a YouTube page. Worked with embedded audio and video.

COGNITE | 3D Engineering | WebGL, TypeScript
Jan 2019 - April 2019 | Oslo, Norway

- Improved the performance of a 3D rendering engine
- Raised frame rate from 15 FPS to 23 FPS, reduced file size from 98 MB to 32 MB, and halved the time to first visible geometry on one benchmark model.

IMAGINE COMMUNICATIONS | Hardware Design | VHDL
September 2017 - December 2017 | Toronto, Canada

- Worked on an FPGA-based product that routed uncompressed video over 100 GB/s Ethernet
- Wrote VHDL subsystems for redirecting video and filtering PTP packets on busy networks
- Wrote a Python script that saved field technicians hours on every new product installation.

UNIVERSITY OF TECHNOLOGY OF COMPIÈGNE | Prototype Design | Circuit, PCB design
January 2017 - April 2017 | Compiègne, France

- Built the prototype and PCB of a hall-sensor based 2D tracking system
- Achieved accuracy finer than 0.1mm before calibration.

PROJECTS [MORE AT ANNAV.CA](#)

5-AXIS CNC WATERCOLOR PAINTING ROBOT | Personal project. See [annav.ca/watercolor](#)

Reconfigured a broken 3D printer to paint using watercolours. Replaced existing stepper motor controllers and added 2 additional axes for natural paintbrush movement. Wrote embedded g-code interpreter to control robot. Currently working on a second version with improved mechanics.

DRIVE SAFE | Finalist at MakeMIT 2019 (24 hour event). See [annav.ca/drive-safe](#)

Automatic collision avoidance on an RC car. My contribution was adding brakes and re-building the RC car's power system to let it carry the combined weight of the car, new circuitry, and phone.