

# LEAH HARTWELL

## MECHANICAL ENGINEERING STUDENT

### CO-OP WORK EXPERIENCE

#### Machine Learning & Hardware Engineer → [3DQue Systems](#)

MAY 2021 → ONGOING

- Leading development of a [3D printer monitoring system](#) which detects a variety of common 3D printing failure modes by building temporal object detection models with TensorFlow and PyTorch
- Automated mass data collection by programming multiple Python scripts that generate random print failure files, and creating Bash scripts to auto upload GCODE to printers and to take timelapses
- Guided design of custom Pi Camera mount with adjustable arm to get optimal view of nozzle head

#### Mechanical Engineering Co-op → [entrepreneurship@UBC](#)

JUL 2020 → DEC 2020

- Simultaneously worked at two startups - BIOFORM Technology and Verdi Expeditions - within the e@UBC HATCH Accelerator Program where I designed and built mechanical systems while learning the nuances of entrepreneurship

#### Mechanical Design Engineer → [BIOFORM Technology](#)

JUL 2020 → JUN 2021

- Responsible for designing and prototyping custom multi-layer nozzles, posttreatment and winding systems for production platform which will create stretch wrap and medical tubing for our pilot trial
- Gained extensive design for manufacturability and assembly knowledge while working closely with senior engineering consultant when iterating through prototypes throughout the year

#### Machine Learning & Mechanical Test Engineer → [Verdi Expeditions](#)

SEP 2020 → DEC 2020

- Working on proprietary sensing unit to be used in new seed-round smart valves to sense flow/no-flow conditions through drip tube using a sensor and background neural network model
- Designed, built and programmed an automated test jig to rigorously test solenoid valves to choose the best and most economic option to be used within each of the Verdi smart valves

### RECENT PROJECTS

#### UBC Open Robotics Design Team

##### Mechanical Co-Lead → [Pianobot](#)

SEP 2020 → DEC 2020

- Responsible for guiding and leading junior members while overseeing all mechanical aspects of a robot which can read and play the piano at Level 4 RCM
- Wrote a Python script which calculates force transferred from a linear actuator to the fingertip in order to find optimal dimensions for the finger design to press down piano keys

##### Mechanical Engineer → [RoboCup@Home](#)

SEP 2019 → AUG 2020

- Designed belt-driven differential gear systems for elbow/wrist allowing for compact joints and decreasing material cost for larger carbon-fibre chassis of arms for our autonomous service robot
- Analyzed components with FEA in Solidworks Simulations to verify that parts could withstand known forces and torques on arm in static and dynamic states

##### Kleaner → [Personal Project](#)

APR 2020

- Built a cleaning system for reusable Keurig cups which spins an angled cup holder using a stepper motor while water rinses coffee grounds out into a filter
- Soldered Arduino, water pump, stepper motor driver, button, transistor, resistor, wires to PCB and programmed Arduino to control pump and motor with a button

##### STOCKnote → [Hack Western 7 \(Best Hardware Hack Winner\)](#)

NOV 2020

- Won Best Hardware Hack out of 435 participants by individually creating a notification device that tracks real-time fluctuations in stock prices using a Raspi 4, OLED display, button, LEDs and Python
- Users are able to create a watchlist and scroll through each stock shown on the OLED display
- Sudden spikes or dips in the stock price are identified through an algorithm and are indicated on both the OLED display in words and by the flashing LEDs (increases/decreases and changes in speed are indicated through colour and flash variations)

- 📍 Richmond, BC, Canada
- ☎ 778-833-3921
- ✉ [leahh222@student.ubc.ca](mailto:leahh222@student.ubc.ca)
- 🌐 [www.linkedin.com/in/leahh1hartwell](http://www.linkedin.com/in/leahh1hartwell)
- 🔗 <http://leahhartwell.tech/>

### EDUCATION

#### University of British Columbia

##### BASc in Mechanical Engineering, Biomedical Option

SEP 2019 → EXPECTED MAY 2023

Year 3 CGPA 3.66

Co-op: Completed 3/4 work terms; Available for 8 months beginning January 2022

#### Kwantlen Polytechnic University

##### Engineering First Year Certificate Program

SEP 2018 → MAY 2019

Year 1 CGPA 3.89

Certificate in Engineering (w/ Distinction)

### TECHNICAL SKILLS

#### Software/Programming:

##### CAD/FEA/CFD

SolidWorks OnShape AutoCAD

##### Data Analysis

MATLAB Maple Excel

##### Languages

Python Bash C/C++

HTML/CSS/Javascript

##### Operating Systems

Linux Windows

##### Version Control

Git/GitHub

##### Machine Learning:

TensorFlow PyTorch scikit-learn

#### Hardware:

##### Machining

3D Printer Mill Lathe Drill

Band Saw Water Jet Spot Weld

##### Microcontrollers

Raspberry Pi Arduino Microchip PIC

##### Actuators/Sensors/Transducers

Pumps Motors Infrared Sensors

Flow Rate Sensors Pressure Transducers

##### Testing/Validation

Circuit Analysis Soldering Oscilloscope

#### Design:

DFM/DFA FMEA/FEA/CFD CAD

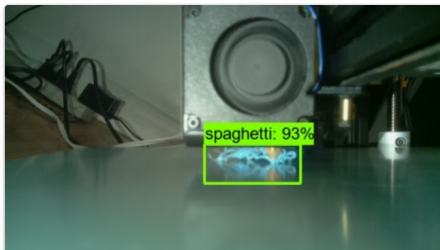
GD&T Prototyping BOM Specification

# Leah Hartwell's Technical Project Portfolio

This portfolio features most of the projects I have worked on over the years. I chose to build this collection of technical projects on Notion so that it could work as a kind of "living document" as I add to older projects and start new ones in the future. If any of the projects catch your eye, click on its card below to learn more details. Feel free to connect with me on [LinkedIn](#) or shoot me an [email](#) if you would like to discuss any projects as well!

Gallery view ▾

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## 3D Print Checker: Failure Detection System

May 3, 2021 → September 3, 2021

Leah Hartwell

Machine Learning TensorFlow PyTorch Python B  
3DQue Systems Inc.

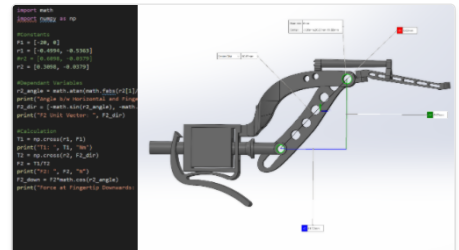


## STOCKnote: Real-Time Stock Notification S...

November 27, 2020 → November 29, 2020

Leah Hartwell

Python Raspberry Pi GPIO LEDs OLED Display  
Hack Western 7 Best Hardware Hack

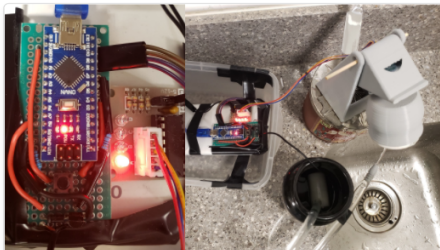


## Pianobot: Piano Playing Robot

September 8, 2020 → December 31, 2020

Leah Hartwell

UBC Open Robotics Design Team  
Leadership SolidWorks Python  
Mechanical Co-Lead

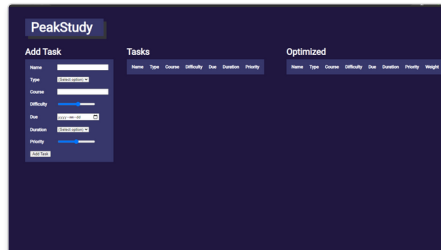


## Kleaner: K-Cup Cleaning System

April 27, 2020 → May 25, 2020

Leah Hartwell

Arduino Nano Stepper Motor Water Pump Transistors

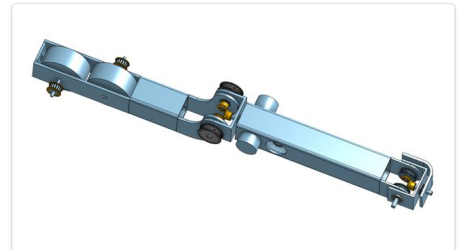


## PeakStudy: Task Optimization Web App

March 6, 2020 → March 8, 2020

Leah Hartwell & Joya Lee

HTML CSS Javascript  
cmd-f 2020 Hackathon Top 10

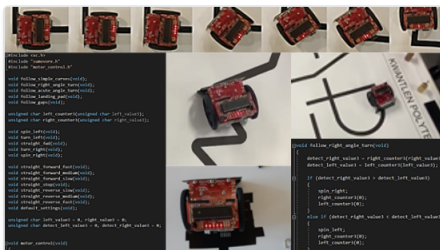


## Robotic Arm: Autonomous Service Robot

September 8, 2019 → April 30, 2020

Leah Hartwell

UBC Open Robotics Design Team  
OnShape SolidWorks Simulations (FEA)  
RoboCup@Home Competition



## SOP (Slap-On-Plastic): Line Following Robot

March 4, 2019 → April 8, 2019

C IR Sensors Motors

APSC 1299 Robotics Contest 3RD Place