

## CONTACT

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📍 Vancouver, BC, Canada

# JOHNNY LI

Mechatronics Engineer

## PROFILE

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Mechatronics engineer with 3 years of work experience in mechanical design and prototyping utilizing SolidWorks, experimental testing and hands-on work. I am interested in work related to mechanical design, robotics and software.

## EDUCATION

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### University of British Columbia

Bachelor of Applied Science  
Mechanical Engineering  
(Mechatronics Option)  
Sept, 2011 – Apr, 2016

## TECHNICAL SKILLS

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### Mechanical

SolidWorks, PDM  
Rapid Prototyping  
Hand Tools  
Milling Machine, Lathe  
Materials Testing (DSC, DMA, TGA, TMA, rheometry)

### Programming

C, C++, C#, Python  
Microsoft Visual Studio  
Concurrent Programming  
VHDL  
Embedded Systems  
MATLAB, Simulink  
LabVIEW

### Electrical

Oscilloscope  
Multi-meter  
Soldering

### Design

Experimental Design  
Prototyping

## WORK EXPERIENCE

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### Andian Technologies Ltd. (Burnaby, BC)

Apr 2017 – Oct 2019

#### Hardware Engineer, E.I.T.

- Designed and modified mechanical components in track gauge measurement system to be compatible with narrow gauge tracks in the railway industry
- Analyzed current measurement system and reduced the weight of the mechanism by 10% to decrease physical strength required by users to operate
- Designed and manufactured a prototype enclosure to position laser profiling sensors used for rail profiling to provide quick setup and storage of profiling equipment following ANSI and FDA standards
- Implemented new internal part numbering scheme using SolidWorks PDM to keep revisions of part designs and improve traceability of parts and BOMs for manufacturing

### Peak Products Inc. (Richmond, BC)

Jan 2015 – May 2015

#### Co-op Student

- Prepared drawings and CAD models on over 50 new and existing products using SolidWorks to update the company internal database
- Developed product manuals including all technical documents, engineering drawings, QC programs and standards to create full specifications on each product
- Reviewed samples of new products from manufacturer and reported discrepancies between specifications and manufactured product to improve quality control
- Collaborated with marketing team to review product and packaging design to simplify consumer experience

### Convergent Manufacturing Technologies Inc. (UBC)

Sep, 2013 – Aug 2014

#### Co-op Student

- Manufactured a variety of composite and resin samples used for DSC, DMA, and rheometers to collect data on material characteristics
- Fitted cure kinetics model to experimental data and determined material properties of samples using proprietary software and Excel
- Operated and maintained lab equipment used to conduct DSC, DMA and rheometric tests in an organized and clean manner for accurate and reliable results
- Assisted in composite part lay-up and curing for testing and analysis

### IPAC & Power Chemicals Ltd. (Vancouver, BC)

May 2013 – Aug 2013

#### Co-op Student

- Designed and built a hand-held adjustable voltage and current analog source with through-hole components used for verifying correct sensor interface settings of apparatus in the lab
- Assembled pump skids with NPT piping, tubing and spray nozzles and tested for proper functionality during trials and usage on field
- Conducted testing and analyzed data on the parameters and characteristics of the nozzle spray to determine best nozzle suited for applications
- Installed hardware such as a Siemens MultiRanger for ultrasonic transceivers or variable-frequency drives to control pumps

## TECHNICAL PROJECTS

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### Capstone Project: LB Foster Rail Geometry Detector

Sept 2015 – Apr 2016

- Worked as a group of four students to design a sensor system to measure track parameters such as train velocity and turn direction separate from train on-board systems
- Coded threshold sensor fusion algorithm to determine whether the train is in motion or stopped to improve velocity calculations
- Eliminated gravity from acceleration in each axis of IMU using quaternions to improve accuracy of acceleration data
- Collected and analyzed accelerometer and gyroscopic data from train to determine best method of signal processing

### Autonomous Air Hockey Player

Mar 2016

- Worked as a group of two to design an autonomous robot player to play defense by moving the mallet to defend its goal
- Designed mechanical hardware for holding the hockey mallet and integrating with miniature air hockey table
- Programmed the motor controller and tuned a PI controller to produce a smooth and fast response
- Developed a method to accept commands from computer vision C# interface and convert to physical motion

### Data Acquisition Using Visual C# and Motor Control using Embedded C

Jan 2016

- Wrote C# code to acquire and parse accelerometer data from TI MSP430 microprocessor based development board to display on a user interface using serial communication through UART
- Soldered and tested a PCB for controlling DC, stepper and servomotors using the MSP430 and laptop to interface
- Programmed a closed loop PI controller on the MSP430 microcontroller to control a motor using the estimated transfer function of motor and encoder

### Two-Axis CNC Controller Design

Nov 2015

- Planned the trajectory of the tool using feed-rate profiling for any path using MATLAB
- Designed parameters of a lead-lag controller for the two-axis table to minimize contour error in trajectory using MATLAB
- Improved controller with a pole placement controller design and compared simulated and physical responses between controller designs using MATLAB and Simulink

### Dual Elevator Simulation

Nov 2015

- Developed a dual elevator simulation in C++ using concurrent programming incorporating visual display of elevator system and keyboard input of user commands
- Utilized synchronization techniques and data structures to ensure threads and processes functioned efficiently
- Debug and tested the program to ensure algorithm for dealing with multiple user inputs and simulated elevator fault (taking one elevator out of service) did not crash the simulation

## EXTRACURRICULAR ACTIVITIES

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### UBC Snowbots

Jan 2014 – Apr 2014

#### *Mechanical Team Member*

- Designed and specified glass-fibre composite structure to support GPS antenna and cameras for computer vision
- Assembled and machined parts of the autonomous robot

### UBC Supermileage Team

Sept 2012 – May 2013

#### *Aero Team Member*

- Modeled potential headlight concepts for new Urban Concept car in SolidWorks
- Assisted during various stages of new aero-shell construction involving plastering, constructing foam plug for female mold aero-shell, preparing female mold for carbon fibre lay-up
- Hand lay-up of carbon fibre for parts of the aero-shell