ANDREW SHIN

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Skills

- **Software** : Java, C#, C++, Python
- **Biomedical** : Microfludics, Fluid Dynamics, Prothesis, Myoelectric, Immunoassay, LNP
- **Mechanical**: SolidWorks, AutoCAD, Prototyping, Circuitry

Experience

- **Instrumentation Engineer**
  Cytiva - Precision NanoSystems Inc. *Sep 2023 - Dec 2023*
  - Worked in **Sustaining Engineering** to support and improve new and existing devices and designs
  - Designed and built **test jigs** for validation and functional tests to assess **flow rate** and **stick-slip** behaviour of syringes
  - Created **GD&T** standard **P&ID** drawings of the external **pipeline** for the 'GMP System' instrument
  - **Redesigned packaging** for microfludic cartridges to reduce damage during storage and transportation

- **R&D Microfludics Engineer**
  Vital Biosciences *Jan 2023 - Apr 2023*
  - Tested **microfluidic** devices to conduct **lab-on-disc immunoassay** experiments
  - Designed microfluidic paths using **AutoCAD** and **SolidWorks** to be milled and injection molded
  - Investigated failures in on-disc assays through **image** and **video analysis** and integrated **iterative testing** to develop solutions
  - Developed passive fluid mixing methods, decreasing experiment time and reducing failure rates
  - Performed material **validation test** used in disc assembly and reagents used in immunoassays

Projects

- **Prosthetic Hand Device**
  - Prototyped a two-finger servo driven **prosthetic device** that actuates based on **EMG signals**
  - Designed 64x tooth two **gear system** to convert motor torque to **clamping force** holding up to**100g**
  - Designed **circuit** to collect, filter and categorize EMG signals from muscles
  - Optimized **Amps** and **Rectifier** to produce desired gain and **increase resolution** of EMG signal
  - Designed **Bandpass Filter** to reduce noise outside of the **90-200 Hz** frequency range of EMGs
  - Develop **Arduino** .INO scripts to translate analog input from EMG signals control the device
  - Conducted **FEA** on clamp attachment to reduce areas of stress concentration and deformation

- **EMG Fabric R&D Hardware - UW Biomechatronics**
  - Developed reusable, fabric-based **EMG sensors** to be used with myoelectric devices
  - Designed **electrodes** and flexible **circuitry housing** optimized for mobility - flexion, rotation
  - Collected and processed EMG data using an **Arduino, NumPy**,and **SciPy**
  - Designed and manufactured functional prototype of armband and reusable electrodes

- **Object Detection - Hand Signals**
  - Developed a program to recognize and **translate** various **hand signals** into English in real-time
  - Used **Python**, **OpenCV** and **LabelImg** to collect image classification data
  - Trained SSD Model to classify and draw bounding boxes on images

Education

- **University of Waterloo**
  Candidate for Bachelor of Applied Science, Biomedical Engineering
  - Data Structures/Algorithms (C#/C++), Dynamics, Circuits, Signals, Prototyping/Design, Systems Modelling