

# John Liu

✉ liuyuhengs@gmail.com | ☎ (403) 383-6907 | 🌐 JohnLiu | in John Liu | 🌐 Portfolio

## Education

### University of Waterloo

2021 – 2022

Master of Engineering – MEng, Electrical and Computer Engineering  
Specialization in Artificial Intelligence and Machine Learning

### University of Waterloo

2015 – 2020

Bachelor of Applied Science – BASc, Honours Mechanical Engineering (With Distinction)

## Skills

**Languages** Python, C++, JavaScript, TypeScript, SQL, MATLAB, HTML, CSS

**Libraries/Tools** PyTorch, TensorFlow, Keras, Scikit-Learn, React, AWS, Pandas, NumPy, Docker, Git, Linux OS, LaTeX, CAD

**Applications** Data & Quantitative Analysis, Supervised/Unsupervised Learning, Reinforcement Learning, Predictive Analysis/Modeling  
Clustering and Classification, ML Algorithms, Data Structures

## Projects

### MIT-PITT-RW (MIT Driverless) | Software Engineer (Plotly, Pandas, NumPy, SciPy, Docker)

July 2022 – Present

- Developed software for a high-speed autonomous racecar capable of reaching speeds of 150mph+ for the Indy Autonomous Challenge
- Generated vehicle pathing using cubic spline models allowing for safe attacking and defending maneuvers of the vehicle which enabled autonomous vehicle passing at 150mph during the Las Vegas Motor Speedway competition
- Optimized racing lines for shortest distance and minimum lap times, considering both vehicle dynamics and environmental factors to ensure ideal maneuvering around the racetrack

### Slime Simulation (Python, NumPy, SciPy, Pillow)

Nov 2022 – Dec 2022

- Wrote software to develop a swarm intelligence simulation to demonstrate the complex behaviour and pattern formation of slime mold
- The program consists of thousands of agents defined by a simple set of instructions that when interacting together via stigmergy, produce organic global behaviours that closely mimic the growth and movement of real-life slime molds
- Post processing using the Pillow library to allow for smooth visualization of simulation even with low hardware specifications

### Sentiment Analysis on Movie Reviews and Classifier (Pytorch, Scikit-learn, Pandas, NumPy)

June 2022

- Developed neural network architecture to predict positive and negative movie reviews on IMDb review dataset (84% accuracy)
- Preprocessed data using Word2Vec and Bag of Words (BoW) techniques before training custom designed neural network models
- Classification on various data sets and data analytics using Scikit-learn to perform PCA, K-means clustering, DBScan, and T-SNE

### Aerial Manipulator (MATLAB, Simulink, OpenCV)

Sep 2019 – May 2020

- Autonomously controlled drone modified with a manipulator attachment to grab objects from front and retract to center
- Implemented object detection using onboard camera through colour and edge detection as well as QR code and AprilTag detection
- Winner of design award for Best Engineering Design Process

## Work Experience

### The Woodbridge Group | Mechanical Engineering

Sep 2018 – Dec 2018

- Successfully led the conceptualization and construction of a pour head test system allowing for less downtime during routine inspections resulting in significant cost savings (>\$50,000 per hour of downtime)
- Detailed P&ID design in AutoCAD and modeling in SOLIDWORKS of pour head assembly and components

### Nytrix Ltd. | Product Development Engineering

Jan 2018 – Apr 2018

- Created simulation system allowing for detailed analysis of product performance and capabilities based on optics calculations
- 3D CAD modelling of touchscreen enclosures for injection molding with focus on DFM and DFA
- Developed a script to streamline company design procedures by automating product and CAD model revision changes
- Designed cost optimization script which realized the use of more cost-efficient components (>50% cheaper)

### HubHead Corp. | Systems Engineering

May 2017 – Aug 2017

- Worked directly with clients to create and organize enterprise asset management demos in order to optimize management procedures

### Tyco Security Products | Mechanical Designer

Aug 2016 – Dec 2016

- Performed detailed CAD design in Creo and 3D printed product prototypes to test for tolerances, quality, and functional capabilities