Chelsea Huang

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Biomedical Engineering | Waterloo, ON

SKILLS

Languages | Python · Matlab · C++/C · Arduino · C# · VHDL · HTML · CSS · Java · Kotlin
Tools & Platforms | Git · Linux · Pandas/NumPy · PyTorch · OpenCV · Arduino · Android · Jira · React
Applications | SolidWorks (Certified Associate) · 3ds Max · Eagle · LTspice · Unreal Engine · COMSOL · AutoCAD

EXPERIENCE

Research & Development Co-op — *PhotoMedicine Labs* | *Waterloo, ON* | MAY 2023 - CURRENT

- Designed and fine-tuned **deep learning** model parameters in **PyTorch** to improve registration accuracy by 50%
- Created and validated algorithm in **Matlab** to remove intensity artifacts, reduced error from 60% to 10%
- Refactored black-box function calls in **Python** from >10 library files for efficiency, reducing runtime by ~2 hours
- Processed large whole slide images (>3 GB) using **OpenCV** and **scikit-image** for stain-agnostic registration
- Conducted wet-lab experiments, in particular *in vivo* imaging with PARS technology and **optical laser** alignment

Data Science Software Developer Intern — *NuraLogix Corp.* | *Toronto, ON* | MAY - AUG 2022 & JAN - APR 2023

- Developed and improved two deep learning models with PyTorch to clean data and reduce error by 25%
- Conducted data processing for two teams with **pandas**, **NumPy**, condensed timeline from 2+ weeks to 3 days
- Extracted colour features from images in various colour spaces with OpenCV, with >75% label accuracy
- Refactored and integrated preliminary research code to features in flagship application workflow

Soft Robotics R&D Engineering — *Waterloo Microfluidics Lab* | *Waterloo, ON* | SEPT - DEC 2021

- Iterated soft robotics product for lymphedema using **SolidWorks**, **AutoCAD**, compressing timeline by 33%
- Translated patent for entry to 2 international markets, enabled distribution plan with estimated $100k revenue
- Generated novel **PCB** designs using **Eagle**, optimizing and consolidating testing pipeline with soldered parts

SELECT PROJECTS

Automatic Pain Detection in Infants (Capstone) | SEPTEMBER 2022 - CURRENT

- Designing and building stand-alone system for pain detection using computer vision and electrical sensors
- Conducted feasibility analysis by meeting with relevant stakeholders, clarified current protocol and pain points

Ultrasound Sensing of Hand Gestures | NOVEMBER 2022

- Designed a system using **Arduino** and ultrasonic sensors to detect 1 of 3 hand gestures with minimal guidance
- Used piezoelectric ceramics to generate ultrasound waves for distance detection with ultrasonic sensors

Modelling Functional Electrical Stimulation (FES) for Treating Foot Drop | APRIL 2022

- Created and implemented state-space equations in Matlab to represent shank-foot (tibialis anterior) system
- Conducted sensitivity analysis with varying inputs to validate/verify behaviour in response to FES signals

EDUCATION

Biomedical Engineering (BASc), Life Sciences & Computing Options — *University of Waterloo* | 2019 - 2024

- GPA: **94.02%** | Faculty of Engineering Dean's Honours List for 5/6 past terms
- 2x NSERC USRA (2023, 2021), President's Research Award (2022), Lau Engineering Scholarship (2021)

Relevant Coursework —

- Image Processing (2023) — *Theoretical basis for image processing; edge detection, visual systems, subject tracking.*
- Control Systems (2022) — *Feedback controllers, root-locus & Bode plots, lead-lag compensators; achieved 100%.*
- Introduction to Pattern Recognition (2022) — *ML concepts and algorithms, with applications to pattern recognition.*

ACTIVITIES & INTERESTS

Badminton · Traveling · Animation & CAD · Video Games & Technology · Snowboarding · Puzzles