

# YOUYOU YANG

Github: wppqywq

Email : youyou.yang@mail.mcgill.ca

Mobile : (438)941-6404

## EDUCATION

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- **Mcgill University** Montréal, CA  
*Bachelor of Science in Physics and Computer Science* *Aug. 2019 – June. 2023*
  - **Relevant Coursework:** Quantum Mechanics, Astrophysics, Mathematical Analysis, Data Science, Machine Learning, Algorithm Design, and etc.

## WORK EXPERIENCE

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- **BorgWarner China Technical center** Shanghai, CN  
*Software Development Intern* *July 2021 - August 2021*
  - **Task 1:** Develop the **communication protocol, interface and routing** in Geely Lotus automobile controller based on AutoSAR.
  - **Activity:** Generated interface files in C using **Python** scripting.
  - **Task 2:** Led upper computer modularization for "Automatic Express Car" project, implementing fixed-time and fixed-point transportation with **ROS** package on **Raspberry Pi**.
  - **Activity:** Wrote Linux shell scripts to regularly run Python scripts, sending signals to lower computer to run to specified coordinates on GMapping package-built graph.
- **Dreame Tech** Suzhou, CN  
*Software Testing Intern* *May 2021 - June 2021*
  - **Task:** Test beta version of Dreame Z10 Robot Vacuum cleaner.
  - **Activity:** Managed firmware of the robot and control features of the Mijia app using Xmind. Captured log data with **Bash** scripts to identify and debug issues. Performed version management and problem reporting on **Jira** to assist developers in resolving bugs.

## RESEARCH EXPERIENCE

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- **McGill ATLAS Group** Montréal, CA  
*Undergraduate Researcher* *May - Dec 2022*
  - **Sep - Dec 2022: Research on the parameters of Effective Field Theory Lagrangian**
    - \* Supervised by Prof. Brigitte Vachon and John McGowan.
    - \* Estimate the parameters through maximum likelihood estimation (**MLE**) fitting method. Focused on the VBS  $W\gamma$  reaction data and analyzed the impact of systematic uncertainty on the confidence level.
  - **May - Aug 2022: Studies of gauge bosons self-interactions in high-energy proton-proton collisions**
    - \* Supervised by Prof. Brigitte Vachon, John McGowan and Xingguo Li.
    - \* Funded by McGill Science Undergraduate Research Awards (**SURAs**).
    - \* Analyzed Vector boson scattering (VBS)  $W\gamma$  reaction data from the frame of Standard Model Effective Field Theory(**SMEFT**) with PyROOT library, to search for the existence of anomalous quartic gauge couplings (aQGC).

## PROJECTS

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- **Apr 2023: Building an Electrocardiogram (ECG) with Circuit and Arduino**
  - **Task:** Obtained a clear and accurate ECG waveform.
  - **Activity: Hardware design** on a breadboard circuit, including a differential amplifier, a notch filter, and a low pass filter, to measure the ECG signal.
  - **Result:** After input signal though above circuit, successfully observe the signal roughly using an **oscilloscope**, and fed it into the **Arduino** board for further visualization.
- **Apr 2022: Measurements of Lambda Cold Dark Matter parameters with Markov chain Monte Carlo method**
  - **Task:** Set constraints on the basic density parameters and the Hubble's constant.
  - **Activity:** Fit **cosmic microwave background (CMB)** data to the standard model of the Lambda Cold Dark Matter ( $\Lambda$ CDM) using the **Markov chain Monte Carlo (MCMC)** method.

- **May 2022: Monte Carlo Tree Search for the Colosseum Survival game**
  - **Task:** Developed an intelligent student agent using the **Monte Carlo Tree Search** algorithm to play the Colosseum Survival game.
  - **Activity:** Implemented four approaches: selection, expansion, simulation, and backpropagation.
  - **Result:** Successfully beat most of the random opponents and searched for the next step quickly with no significant memory usage.

## ADDITIONAL EXPERIENCE:

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- **Published Documentation:**
  - **Jul 2022:** J. P. Mc Gowan, Z. Wang, B. P. Honan, *et al.*, “Observation and differential measurement of electroweak production of  $W(l,\nu)\gamma + \text{jets}$ ,” CERN, Geneva, Tech. Rep., 2022. [Online]. Available: <https://cds.cern.ch/record/2819968>
- **Talks :**
  - **Aug 2022:** Summer Undergraduate Research Showcase, McGill University: *Sensitivity studies in the search for Anomalous Quartic Gauge Couplings in proton-proton collisions at the LHC.*
  - **Aug 2022:** ATLAS Canada Summer Student Presentations, CERN: *Sensitivity studies in the search for Anomalous Quartic Gauge Couplings in proton-proton collisions at the LHC (same).*
- **Hackathon:**
  - **Jan 2022:** Hack Mcwics 22, McGill Women in Computer Science: Most Practical Award-  
*Developing a website of Serving Size Converter.*

## SKILLS

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- **Programming Skills:**
  - Proficient in **Python** with experience in various libraries, including **NumPy**, **SciPy**, **Pandas**, Matplotlib, Astropy, ROS, PyROOT, and Scikit-learn.
  - Familiar with **C**, **Bash**, OCaml, Matlab. Have basic knowledge of **HTML+CSS**.
  - Familiar with hardware design, experienced in **Arduino and Raspberry Pi**.
  - Skilled in using **Linux** operating system, **Git** version control, and **L<sup>A</sup>T<sub>E</sub>X**.
- **Language Skills:**
  - Native Mandarin speaker.
  - English with an overall IELTS score of 6.5.
  - French at a beginner’s level.