SIMON GHYSELINCKS

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Education

University of British Columbia — Vancouver, British Columbia
BASc in Engineering Physics, Minor in Computer Science — *Sep 2020 – May 2025 (Expected)*

Cumulative GPA: 95%

Research Interests

Computational Modeling and Simulation: Numerical algorithms for simulating physical systems, computational optimization, applied linear algebra, applications in robotics and signal processing.

Machine Learning and Computer Vision: Applied machine learning and deep learning, interpretable AI and network dissection, computer vision for robotics, 3D environmental reconstruction.

Research Experience

UBC ATLAS Group — Vancouver, BC, Canada
USRA Undergraduate Research Assistant — *May 2023 – Aug 2023*
Supervisors: Cole Helling and Alison Lister

- Contributed to the complex task of testing and characterizing sensor modules for the new ATLAS detector at CERN's Large Hadron Collider.
- Identified the source of a critical software and hardware issue from an analog signal being measured by ATLAS Inner Tracker modules. Produced a report and proposed solution, working with Python, C++, and InfluxDB.
- Collaborated with supervising post-doctoral researcher to design and implement safety protocols for the controls and monitoring system adopted by module test sites globally.
- Delivered presentation of results at an ATLAS Canada summer student researcher meeting.

Projects

Computer Vision - Personal — *PyTorch Projects* | *Dec 2023 - Present*

- Comparative analysis image classification methods both classical and neural network.
- The project aims to explore deep learning using PyTorch with increasingly complex models

Reinforcement Learning Reaction Wheel Unicycle - Capstone — *Proposal* | *Aug 2023 - Present*

- Working in a team of five senior students to address and expand upon the research questions posed by 'The Wheelbot' (https://sites.google.com/view/wheelbot), with the addition of a steering reaction wheel and the exploration of reinforcement learning controls.
- Team leader in physics and control modeling, telemetry, and environmental sensing.

Machine Learning Competition - ENPH 353 — *Galadin* | *Jan 2023 - May 2023*

- Independently developed an vehicle controller in a competitive environment typically dominated by two-person teams, leveraging a robust technical stack including Linux, ROS, Gazebo, Python, OpenCV, Keras, WandB, and Git.

Autonomous Robot Competition - ENPH 253 *SquarewaveFiltering* | *Jun 2022 - Aug 2022*

- An autonomous robot competition integrating mechanical, electrical, controls, and computer engineering expertise.
- Developed a signal processing algorithm in C for efficient square-wave frequency filtering with accompanying custom PCB for an infrared signal detection array

Graphical Physics Simulation of Marble in Funnel - MECH 223 *Mech-223-Sim* | *Jan 2022 - Feb 2022*

- Independently developed an advanced Matlab GUI simulation beyond the standard curriculum scope for the 2022 MECH 223 engineering design challenge.
- Guided the team to a first-place victory among 20 competing teams, leading to a leadership-based academic award.

Skills

Programming Languages: Python, C/C++, Java, MATLAB, Julia

Software and Tools: Linux, ROS, Gazebo, Simulink, Git, Grafana, InfluxDB

Machine Learning and AI: Deep Learning, Keras, PyTorch, OpenCV Libraries, Data Analysis and Modeling, Regression Based Models, PCA

Mathematics: Applied Linear Algebra, Statistics and Probability, Complex Analysis, Signals Processing, Applied PDEs and ODEs

Engineering: Robotics, Controls, Microcontrollers (STM32, Raspberry Pi, Nvidia Jetson), FPGAs, PCB Design, Machine Design, 3D Printing, CAD (SolidWorks, Onshape), Circuit Analysis

Languages: English (Native), Spanish (Proficient), French (Proficient)

Scholarships & Awards

2023 NSERC Undergraduate Student Research Award
Research grant awarded for work with ATLAS UBC supervised by Dr. Alison Lister and Dr. Cole Helling.

2021/22/23 Trek Excellence Scholarship
Awarded to students in the top 5% of their undergraduate year, faculty, and school.

2023 Novicov Scholarship
Awards are made on the recommendation of the Faculty of Applied Science.

2022 Eric P. Newell Leadership Award
For demonstration of student leadership and achievement of high academic standing.

2021 Donald J. Evans Scholarship in Engineering
Awards are made on the recommendation of the Faculty of Applied Science.

2021 Hector John MacLeod Scholarship in Engineering
Awarded to engineering students with highest academic standing entering second year.

Organizations

Engineers and Geoscientists BC *Dec 2021 – Present*
Student Member

Canadian Association of Physicists *Jan 2023 – Present*
Undergraduate Student Affiliateship

Vancouver Julia Users *Nov 2023 – Present*
Member

Hobbies

Trekking, Classical Guitar, Peruvian Folklore, Drift Skates, Reading Biographies, Chinese Traditional Tea