

## EDUCATION



**Doctor of Philosophy in Quantum Computing**, University of Toronto 09/2025 - 11/2030  
*AI - Quantum Machine Learning - Distributed Quantum Computing - Research Integrity - Management*

**Master of Computer Science**, ENSEIRB-MATMECA School of Engineering (GPA: 4.0/4.0) 09/2022 - 09/2025  
*AI - Machine Learning / Deep Learning - Quantum Information - Algorithms and Data Structures - Software Engineering - Data Science - Computer Architecture - Parallel Computing - Team Projects - Computer Networking - Sustainable Development - Management - English*


**French Preparatory Classes**, CPGE Lycée Michel-Montaigne (GPA: 3.6/4.0) 09/2020 - 07/2022  
*Mathematics - Fundamental/Experimental Physics - Electrical/Mechanical Engineering - Chemistry - Philosophy*

**High-School Diploma**, Lycée Sud Médoc - La Boétie (GPA: 4.0/4.0) 09/2017 - 07/2020  
*Mathematics - Physics - Chemistry - Engineering - History - English - Philosophy*


## EXPERIENCE

**Research Intern**, University of Toronto, MSR Research Group   05/2024 - 10/2024

- Developed a novel trainable feature map for Quantum Machine Learning (QML) models using pulse-level control of quantum systems. Leveraged the flexibility of pulse control to optimize the mapping between classical data and quantum states, enhancing the representational capacity of QML models.
- Demonstrated exceptional adaptability across diverse machine learning tasks, consistently outperforming traditional static feature maps in multiple regression tasks while reducing circuit depth by half.
- Currently continuing collaboration with the research group on QML/AI projects as a research volunteer.

**Temporary Worker**, BAM Works  07/2023 - 08/2023

- Engaged in intensive agricultural labor, consistently working 45 hours per week. Demonstrated strong commitment and work ethic, earning the trust of clients and achieving a 100% satisfaction rate. Additionally, improved my English language skills and cultural awareness through immersion in the Netherlands.

**Study Coordinator**, TransPerfect  07/2022 - 08/2022

- Managed a voice recording studio for sample collection to enhance our clients' voice recognition AI solutions. I actively participated in online training sessions to maintain quality standards, resulting in an excellent 98% client acceptance rate of the recordings.

## RESEARCH CONTRIBUTIONS

Thomas, T., Sylvain, L. (2024). AI-Assisted Quantum Encoders for Efficient Operations (Poster).

- Investigated small neural network-assisted quantum encoders to enhance control capabilities and improve accuracy in quantum machine learning.

Thomas, T., Grier, J., Viki Kumar, P., Hans-Arno, J. (2024). Parametrized Pulse Encoder and Efficient Circuit Growth for Quantum Machine Learning (Journal Draft).

- Developed pulse-based control and implemented adaptive circuit growth for improved efficiency and accuracy in quantum machine learning.

Thomas, T., Victor, L., Michaël, C. (2023). Reimplementation of CycleGAN: Unpaired Image-to-Image Translation (Academic Report).

- Reimplemented and evaluated the CycleGAN approach, validating results from the original paper on smaller scale datasets.

## SKILLS AND INTERESTS

**Programming Languages:** Python - C/C++ - Bash - Mojo - Java - Typescript - SQL - PHP - HTML/CSS/JS

**Technologies:** Git - Linux - PyTorch - TensorFlow - Sklearn - Qiskit - PennyLane - JAX - MPI - PostgreSQL

**Areas Of Expertise:** Machine Learning/AI - Quantum Computing - Data Science - Algorithms and Data Structures - Computer Architecture - Software Development - Distributed Systems - Computer Networking - Management

**Soft Skills:** Collaborative mindset - Curiosity - Self-motivated - Effective communication - Analytical thinking

# PROJECTS

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## KEY PROJECTS

### **Go Board Game Winning AI Player** - *Convolutional Networks - Minimax Algorithm* 2024

Participated in a Go tournament against fellow students, securing 1<sup>st</sup> place out of 50 teams. The result was achieved through a strategic, time-based thinking approach tailored to different phases of the game, leveraging optimized neural network architectures under limited computing resources.

### **Bias Prevention in LLMs** - *Large Language Models Training* 2024

Led a small research team to address and mitigate biases in training large language models. Defined bias criteria, evaluated multiple bias reduction techniques, and conducted a case study where the LLM played a role in a decision-making scenario, assessing the success of various approaches in reducing unwanted biases.

### **Contrastive Learning for Image Representation**- *Self-supervised Pre-training* 2024

Reimplemented the SimCLR method on an image classification dataset to pre-train on large unlabeled data and fine-tune on a smaller labeled dataset. Achieved similar accuracies to those reported in the original paper and analyzed performance across different aspects of the experiments, including the size of the pre-training dataset.

### **Foundations of Reinforcement Learning** - *Model-Based and Model-Free Approaches* 2024

Completed an in-depth course on Reinforcement Learning, covering foundational RL algorithms and their applications. Topics included model-free methods like Q-learning, SARSA, and Deep Q-Networks, as well as model-based approaches and policy gradient methods.

### **Advanced AI and ML Projects** - *Symbolic AI - Machine Learning - Deep Learning* 2022-2024

Worked on various AI projects, including reproducing a CycleGAN style transfer model using convolutional networks, performing image classification by fine-tuning deep convolutional networks, conducting text sentiment analysis on Twitter messages, efficiently utilizing knowledge representation frameworks such as ASP and PDDL, and implementing efficient search algorithms, among others.

### **Video Game Action Planning** - *Knowledge representation* 2024

Developed an iterative method using the PDDL (Planning Domain Definition Language) to model and identify a sequence of actions that leads the player to victory in the popular open-world game Minecraft. Several simplifications were applied, and an iterative search method was implemented to find optimal paths for subsets of the problem in a reasonable time.

### **User Space Thread Library** - *Computer Architecture - Parallel Computing* 2024

Headed a team in the development of a C library with advanced features such as mutexes and user space signals. Achieved the highest performance among all student groups and professors' implementations. Implemented n-to-m multiplexing of user threads on kernel threads to leverage multiprocessing.

### **Visualgo: An Algorithms Teaching Website** - *Project Management - WebAssembly* 2024

Coordinated the organization of a team of 7 students over 4 months to develop a fully functional website using cutting-edge WebAssembly technologies. We presented the project during the 2024 ENSEIRB-MATMECA partners' evening.

### **Twitter Sentiment Analysis** - *Natural Language Processing - Support Vector Machines* 2023

Applied Natural Language Processing and Machine Learning to classify the five primary emotions in 40,000 tweets, achieving an average accuracy and recall rate of 65% across the sentiments. Ensured dataset quality through critical data cleaning, applied text vectorization using gensim library, and employed linear Support Vector Machine for modeling.

## REFERENCES

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References available upon request