

TYLER KOWALSKI

☎ +1(647)761-4666 ✉ tkowalsk@uwaterloo.ca 🔗 [linkedin.com/in/tkowalsk](https://www.linkedin.com/in/tkowalsk) 🌐 github.com/tkowalski9938

Technical Skills

Programming Languages: C, C++, GLSL, Python, Bash, Agda, Racket, ARMv8, x86, MIPS, LaTeX
Technologies/Frameworks: CUDA, Vulkan, Pytorch, TensorFlow, NumPy, Pandas
Developer Tools: Linux, VS Code, Visual Studio, Git, Jupyter Notebook, Google Collab, Vim, JIRA
Linguistic Languages: English, Mandarin, Japanese

Education

University of Waterloo

Sep. 2021 - Apr. 2026

Bachelor of Mathematics in Computer Science

Waterloo, Canada

Work Experience

University of Waterloo, Faculty of Mathematics

Sept. 2023 - Dec. 2023

CS 246 Teaching Assistant (OOP in C++)

- Migrated CS 246 **Linux** testing environment from **C++14** to **C++20** and created **Python** scripts to fix code from common **C++20** compiler errors
- Automated testing of assignments via **Bash** scripting, eliminating the need for handmarking
- Individually coordinated demoing and marking of the final project (> 500 students)
- Supported students by teaching weekly tutorials on **object-oriented programming** and **C++**

Core Avionics

Jan. 2023 - Apr. 2023

Embedded ML Inference Engineer

- Augmented ComputeCore™, a safety-critical neural network inference engine for embedded GPUs, to support parallel inference of neural network inference graphs in **Vulkan C**
- Conducted in-depth analysis of **OpenVX** and **MIGraphX** to gain insights and inspiration for efficient implementations of neural network graph inference
- Refactored **NNEF AI compiler** to support multiple dependencies per node in inference graph
- Utilized A/B testing with **Python** scripting to design optimized **GLSL** shaders for **AMD E9171** embedded GPU: *Local Response Normalization, Concat, addN, and maxPool2d*
- Added support for *AlexNet, DenseNet, ResNet, InceptionNet* and *Graph Neural Networks* to GPU-accelerated inference engine and debugged using **Pytorch**

Core Avionics

May. 2022 - Aug. 2022

Embedded ML Inference Engineer

- Implemented **Pytorch ONNX MobileNetV2SSDLite** model in **Vulkan C**, resulting in contract from Airbus
- Wrote optimized **GLSL** shaders for deep learning inference on **AMD E9171** embedded GPU: *softmax, leakyReLU, convTranspose2d, padding*, and various **BLAS** functions
- Created a GPU-profiling tool to benchmark neural network inference operations
- **Researched** performance optimizations of CNNs on GPUs, leading to a memory reduction of $\frac{1}{4}$

Projects

TylerFish

Dec. 2023 - Present

Neural Network Chess Engine

- Creating a chess engine that utilizes Monte Carlo Tree Search with a CNN for policy and board evaluation in **C++**, to be accelerated with **CUDA**
- Currently implementing multi-threaded bitboard move generation in **C++**

Pokemon ML

Sept. 2021

Deep Learning from Scratch

- Implemented CNN inference and training using only **Pandas**, **Python** and **NumPy**
- Utilized **L2 Regularization** to prevent overfitting

Professional Development (Online Courses)

DeepLearning.AI

Sept. 2021

Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization

Volunteering

Mentoring the Stars

Jan. 2023 - Present

Providing no-cost tutoring in mathematics for secondary students on Zoom