# Hayden Goodfellow

HaydenGoodfellow.ca
HaydenGoodfellow3@outlook.com
HaydenGoodfellow
HaydenGoodfellow
613-328-1538

**Languages:** C, C++, Python, Rust, Java, Assembly (ARMv7-A, x86-64)
**Technologies:** CUDA, OpenMP, MPI, PyTorch, Linux, Jenkins, PostgreSQL, Git

## Education

### Bachelor of Applied Science in Computer Engineering - University of Toronto

· Minor in Engineering Business · Graduation Expected May 2023 — 3rd Year GPA: 3.89/4

## Work Experience

### Display Software Engineer Intern - AMD — May 2021 - Present

· Found, triaged, and fixed dozens of Linux graphics driver regressions which greatly improved driver stability and performance

· Refactored and optimized Jenkins Linux build and test pipelines which improved overall speed by 20% and raised pipeline stability to over 99%

· Created and maintained fully autonomous Jenkins build, test, and code analysis pipelines which ensured code pushed to customers was free of regressions and met AMD's high-quality standards

· Presented overview of Linux CI/CD pipelines to over 4000 Engineers & Corporate managers as a finalist for the AMD Markham Innovation Showcase where we chosen out of over 100 projects

### Software Developer - Amnesia Escape Games — Summer 2019

· Developed software to monitor and control a distributed system containing over 30 devices such as RFID readers, actuators, and sensors which were connected to 11 Arduino Nano controllers

· Created, using C++, a multithreaded master controller for the entire system which communicated using an RS-485 half-duplex bus and socket connections

· Utilized a PostgreSQL database to log and analyze sensor data for testing and balance purposes

## Projects

### Discrete Laplacian Filter Image Processor — C++ • CUDA

· Created, using C++ and CUDA, an image processing application which utilized the GPU to achieve a 37.9x speedup compared to the CPU-only implementation

· Benchmarked 5 different memory access patterns to determine design which optimized bandwidth

### Beat Saber Map Generator — Python • PyTorch • NumPy • Pandas

· Developed, using LSTM and CNN deep learning models, an application which took in any song and output a complete, high-quality beatmap for the VR rhythm game Beat Saber

· Created tool to automatically download, categorize, and sanitize over 150GB of training data

### High Performance Particle Simulator — C • OpenMP • MPI

· Implemented, using C, a high performance simulator for particle interactions with 3 different versions: one using pthreads, one using OpenMP, and one using Message Passing Interface (MPI)

· Optimized each version and created the fastest overall implementation out of over 50 groups

### Concurrent Database & Database Driver — Rust • Python

· Developed, using Rust, an in-memory concurrent database based off of the EasyDB protocol

· Created, in Python, a database driver and ORM framework to easily interface with the database

### CPU Cache Performance Analyzer — C

· Developed benchmarking tool to measure CPU cache bandwidth, cache size, and cache line size