# Gabriel Robles

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## EDUCATION

**UNIVERSITY OF WATERLOO**
4A - Software Engineering
Expected Graduation April 2022

## SKILLS

**Proficient**
C • C++ • Python • Vulkan

**Experienced**
Java • Scala • Javascript • SQL
Shell • Assembly • OpenGL • OpenCV
Android • Matlab

**Familiar**
HTML • CSS • JQuery • React
Go • Rails

## PROJECTS

**Puppet Pose**
A graphical application written in **C++** that allows to manipulate a 3D puppet. It uses **OpenGL** to render the scene.

**Ray Tracer**
An implementation of a Ray Tracer written in **C++** to render a scene. Implemented a second version in **CUDA** for parallelized execution.

**Lacs Mini Compiler**
Compiler for a programming language subset of Scala (Lacs) written in **Scala**. It implements math operations, function calls, nested procedures, closures and a garbage collector.

**Tetris**
The classic tile-matching puzzle game written in **C++**. The game supports a **graphical** interface for X11; several levels of difficulty; and a customizable input system.

**PDF Reader**
An **Android** application written in **Java** to read, draw and highlight PDFs.

**Paint on Arduino**
A sketching program written in **C** for the **Arduino** platform. A touch LCD screen was used for I/O, and it allows to save the sketches as SVG files.

## EXPERIENCE

**NVIDIA CORP** Vulkan Driver Performance Intern
August 2021 – Present | Remote

- Improve application, used for performance and feature testing, by adding a ray tracing pipeline and an acceleration structure using **Vulkan** extensions to utilize the RT cores in modern Nvidia GPUs
- Refactor **Vulkan** application to reduce code size by 20% and improve readibility

**SIDE EFFECTS SOFTWARE INC** 3D Software Developer
January 2021 - April 2021 | Remote

- Researched and prototyped a novel method to deform volumetric data, iterating over different algorithms to obtain the most performant and precise
- Discussed the features with the technical director and implemented the chosen algorithm in **C++**
- Used the **tbb** library to parallelize the execution of the algorithm, resulting in performance improvement of 600%.

September 2019 – December 2019 | Toronto, ON

- Implemented a physically based sculpting tool using **Python** and Houdini's procedural nodes. This tool allows to modify meshes by applying grab, twist, scale or pinch brushes
- Implemented a user interface for the sculpting tool using **Python** to allow users to interactively modify polygon meshes
- Improved performance by **profiling** the tool reducing calculation time by 70%

**DERIVATIVE** Graphics Engine Developer
May 2020 – August 2020 | Remote

- Implemented several texture operators using **C++** and **CUDA** which expose **OpenCV** functionality to digital artists
- Implemented a surface operator in **C++** which generates random points inside a mesh or on its surface. Apply several optimizations so the tool runs in realtime
- Implemented a code generation script in **Python** to generate boilerplate C++ code used to setup UI parameters

**UNIVERSITY OF HAWAII** Research Assistant
January 2019 - April 2019 | Honolulu, HI

- Created a GUI application, using **Visual C++** and the **MFC** library, to produce a variety of droplets shapes used for biosurface research
- Improved the ADSA **algorithm**, which calculates the surface tension of a liquid by analysing an image of a drop, such that it can work for incomplete droplets
- Replaced optimization library from minpack to dlib **doubling the speed** of the ADSA algorithm

**BEHAVIOUR INTERACTIVE** Game Programmer for Deathgarden
May 2018 - August 2018 | Montreal, QC

- Implemented game analytics using **Unreal Engine 4, C++, Docker, and Node.js** which helped game designers to balance the game
- Programmed game components using **UE4** subsystems and its **networking** features, improving in-game communication

## PUBLICATIONS

[1] G. Li, G. Robles, J. Z. Di, and Y. Y. Zuo. Compound drop shape analysis with the neumann number. *Langmuir*, 36(26):7619–7626, 2020. PMID: 32519874.