Michael Xu

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EDUCATION

UNIVSERITY OF TORONTO
B.A.Sc. in Engineering Science
May 2020 | Toronto, ON
CGPA: 3.53

LINKS

Github: **mshoe**
Website: **mshoe.github.io**
LinkedIn: **mxumichaelxu**

LANGUAGES

C++
C
GLSL
C#
Python
VBA, Tcl, Perl, Verilog, HTML, CSS

SKILLS

Git
Visual Studio
ImGui
Eigen
OpenGL
Unity
Blender
Microsoft Office Suite
MATLAB
LaTeX
Azure DevOps
ffmpeg

COURSEWORK

Algorithms and Data Structures
Operating Systems
Computer Graphics
Physics-based Animation
Linear Algebra
Calculus
Differential Equations
Classical Mechanics
Machine Learning
Deep Learning

OTHER INTERESTS

Computer Graphics Papers
Game Engine Architecture
Cinema
Musical Composition

PROFESSIONAL EXPERIENCE

ROCSCIENCE INC. | Geotechnical Software Developer
May 2020 – Present | Toronto, ON

- Implementation of 3D rigid body and lumped mass physics simulators in C++ to compute rockfall trajectories for the product RocFall3 released in 2022
- Extensive experience with C++ math library Eigen, C++ immediate GUI library ImGui, and graphics library OpenGL for Windows systems
- Continuous collision detection for triangle meshes, spheres, and boxes, accelerated with spatial partitioning structures
- Rigid body friction and non-penetration constraints formulated as a linear complementarity problem with Eigen, and solved using Lemke's algorithm
- Researched penalty based, impulse based, and intersection-free rigid body methods to compare against constraint based methods
- Applied Material Point Method (MPM) to 2D landslide run-out analysis

DYNAMIC GRAPHICS PROJECT | Research Student
September 2019 – April 2020 | Toronto, ON

- Implementation of a 2D differential physics simulator based on the Material Point Method (MPM) in C++, which can control movement through gradient descent, using derivatives of final position with respect to deformation gradients which were computed via back-propagation
- Implementation of a volume renderer for MPM data

ROCSCIENCE INC. | Software Developer Intern
May 2019 – August 2019 | Toronto, ON

- Used Microsoft Azure to design an automatic test suite using the cloud to replace in-house servers
- Derived new parameters for ellipsoids to use in meta-heuristic search methods for slope stability analysis

MICROCHIP TECHNOLOGY INC. | Software Engineering Intern
July 2018 – April 2019 | San Jose, CA

- Used SQLite and C++ to implement an SQL database for storing and retrieving messages from all sorts of FPGA design tools within the Libero FPGA software
- Used Tcl, Perl, and Python to implement an automated regression suite for the Libero FPGA software in Linux

TORONTO HYDRO | Technical Student
May 2016 – August 2016 | Toronto, ON

- Developed VBA scripts to be used in analyzing electrical control room data

AWARDS

2018	3rd	Ontario Engineering Competiton - Programming
2018	1st	UofT Engineering Kompetition (UTEK) - Programming
2016	2nd	WearHacks Toronto Hackathon
2016	3rd	UofT Game-Making Deathmatch

SOCIETIES

2017-2018	Graphics Director	UofT Machine Intelligence Student Team
2014-2015	Lead Guitarist	Senior Jazz Ensemble, Cawthra Park S.S.