Michael Xu

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EDUCATION

B.A.Sc. in Engineering Science, *University of Toronto* Sep 2015 - Apr 2020

- Specialization in Electrical and Computer Engineering
- Graduated with honors
- GPA: 3.53/4.0

WORK EXPERIENCE

Geotechnical Software Developer, *Rocscience Inc.* May 2020 - Present

- Lead the physics engine development of RocFall3, a 3D rockfall simulator for safety assessment of slopes at risk of rockfall
- Researched and developed methods for rigid body dynamics, fast continuous collision detection, and contact mechanics adapted to rockfall simulation
- Managed intern projects which had meaningful contribution to RocFall3
- Wrote technical documents and gave presentations on RocFall3 theory

Software Developer Intern, *Rocscience Inc.* May - Aug 2019

- Developed meta-heuristic search methods for slope stability analysis in Slide3

PEY Software Engineering Intern, *Microchip Technology Inc.* Jul 2018 - Apr 2019

- Developed a database system for FPGA compilation messages in Libero
- Designed a daily automatic testing system for FPGA verilog projects

Technical Student, *Toronto Hydro* May - Aug 2016

- Developed scripts for analyzing electrical control room data

RESEARCH EXPERIENCE

Research Student, *UofT Dynamic Graphics Project* Sep 2019 - Apr 2020

- Thesis: Applications of a Differentiable Physical Simulator Based on the Material Point Method
- Advisor: Prof David I. W. Levin

Summer Research Student, *UofT Dynamic Graphics Project* May - Aug 2017

- Research on the Material Point Method for elasticity simulation
- Advisor: Prof David I. W. Levin

OPEN-SOURCE SOFTWARE

MPM Buddy

- A real-time interactive material point method (MPM) simulator implemented in C++ and parallelized with GLSL compute shaders
- Comes equipped with many interactive features such as external/internal force controllers, geometry editing tools, and colorful visualization of physical properties
- https://github.com/mshoe/MPM_Buddy

Voxel Raytracer

- An isometric voxel ray tracing engine written in C++ and GLSL
- https://github.com/mshoe/GPU_Voxel_Raytracer

AWARDS

- 3rd at Ontario Engineering Competition - Programming 2018
- 1st at UofT Engineering Kompetition (UTEK) - Programming 2018
- 2nd at WearHacks Toronto Hackathon 2016
- 3rd at UofT Game-Making Deathmatch 2016
- Vale Higher Education Scholarship 2015
- UofT President's Entrance Scholarship 2015

SOCIETIES

- Bass Vocalist, UofT Healing Sounds of Music 2020
- Graphic Designer, UofT Machine Intelligence Student Team, 2017
- Lead Guitarist, Cawthra Park S.S. Jazz Ensemble 2014-2015
- Classical Guitarist, Cawthra Park S.S. Guitar Ensemble 2011-2015
- Bass Vocalist, Cawthra Park S.S. Ritz Choir 2011-2015

LANGUAGES

- Primary language: C++
- Experience with large projects: Python, C, C#, GLSL
- Experience with small projects: VBA, Tcl, Perl, Verilog, HTML, CSS

SOFTWARE/LIBRARY SKILLS

- ImGui, Eigen, OpenGL, Pytorch

- Visual Studio, Unity, MATLAB, Blender
- Git, ffmpeg

INTERESTS

- Research: physics based animation, physics based character control, reinforcement learning, neural networks
- General: science, music, guitar, cinema, art, gaming