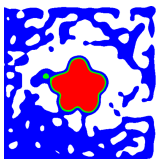
Michael Xu



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Education

Simon Fraser University — May 2023 — Present
M.Sc. in Computing Science

University of Toronto — Sep 2015 — Apr 2020
B.A.Sc. in Engineering Science, Electrical and Computer Engineering Option

Work Experience

Software Developer – Rocscience Inc. — May 2020 — Jan 2023

- Developed the physics and collision detection engines for RocFall3, a 3D rockfall simulator for both mesh-based rigid body and lumped-mass rocks
- Researched applications of the material point method for slope stability analysis and simulation

Software Developer Intern – Rocscience Inc. — May 2019 — Aug 2019

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

Software Engineering Intern – Microsemi Corporation — Jul 2018 — Apr 2019

- Developed FPGA compiler message tools for Libero
- Developed automated testing suites for VHDL and Verilog files to be compiled in Libero

Summer Research Student – University of Toronto Dynamic Graphics Project — May 2017 — Aug 2017

- Research on the numerical instability of the material point method for elasticity simulation

Technical Student – Toronto Hydro — May 2016 — Aug 2016

- Developed scripts for analyzing Toronto Hydro's control room data

Posters

- **Michael Xu**, David I. W. Levin. Deformation Gradient Control of Physically Simulated Elastoplastic Amorphous Objects. *Symposium of Computer Animation*, (2023)

Code

Over the years, I've amassed quite the collection of graphics projects, mostly using C++ and OpenGL. Here I showcase a select few which I'm most proud of.

DiffMPMAnimator3D – github.com/mshoe/DiffMPMAnimator3D

- A software for producing 3D morphing animations of physically simulated elastoplastic amorphous objects. The backbone of the animation method is a differentiable material point method simulator.

MPM Buddy – github.com/mshoe/MPM_Buddy

- A 2D material point method simulator, with lots of visualization and interactive tools.

Voxel Engine – github.com/mshoe/GPU_Voxel_Raytracer

- An isometric game engine with editable voxels and randomly generated terrain.

Awards

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

Software Skills

- Primary language and experience with very large projects: C++
- Experience with large projects: Python, GLSL, MATLAB, LaTeX
- Experience with small projects: C, C#, VBA, Tcl, Perl, Verilog, HTML, CSS
- Libraries: ImGui, Eigen, OpenGL, PyTorch, Numpy
- Software: Visual Studio, Unity, Blender
- Tools: Git, ffmpeg