

# SAM CHENG

## Major in Computer Science

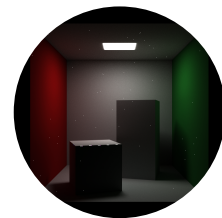
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## PERSONAL TECHNICAL PROJECTS

### JoeTracer: A Monte-Carlo Path-tracer

2022 Jan - 2022 May

- Created an optimizing path-tracer from scratch in **C++**
- Implemented axis-aligned, ray-triangle and ray-sphere intersection checks
- Used BVH data structures to spatially divide objects and accelerate ray intersection checks
- Implemented importance sampling, allowing for arbitrary sampling and faster convergence
- Wrote GUI in **ImGui** and **SDL** (SimpleDirect Media Layer)
- Added multi-threading model using **OpenMP** and debugged performance bottlenecks using **Gprof**
- Simplified build system using **CMake**

### JoeGL: WebGL Rasterization Engine

2022 June - Current

- Implementing a rasterization graphics engine in **Javascript** and **WebGL**
- Implemented 3D perspective and transformation matrices
- Added a movable camera and player controls
- Implemented point and spot lighting
- Writing a simple .obj file parser with support for .mtl files

## ACADEMIC TECHNICAL PROJECTS

### Fill Animation

#### CPSC 221 Course Project

2021 Dec

- Implemented a pixel filling animation generator using search algorithms in **C++**
- Implemented BFS and DFS with stack and queue data structures
- Utilized C++ templates for generic programming
- Debugged program using **GDB**

### Applications of Molecular Dynamics Simulations in Chemistry

#### Multi-Disciplinary Undergraduate Conference (MURC)

2019 Sept - 2020 May

- Worked with a team consisting of a graduate and four undergraduate students and presented at MURC
- Conducted literary and experimental research, individually and with a team, and co-wrote a presentation poster
- Received award "Mentees of the Year"

## TECHNICAL SKILLS

### Languages

C C++ Javascript PHP  
Java GLSL

### Operating Systems

GNU/Linux Windows

### Testing Frameworks

JUnit Catch

### Front-End/GUI

React JavaFX ImGui

### Other Technologies

OpenMP SDL Git/Github Bash  
CMake

## WORK EXPERIENCE

### Audio-visual Student Rover

#### Sauder School of Business, UBC

2021 Sept - 2021 Dec

- Communicated technical support to instructors
- Assisted in troubleshooting and solving audio-visual equipment issues
- Helped set up and take down audio-visual equipment

### Table Tennis Instructor

#### City Centre Community Centre, Richmond

2017 Jan - 2019 May

- Pre-planned lessons and partitioned time efficiently for each lesson.
- Communicated effectively to attendees on skillsets and potential improvements

## EDUCATION

### B.Sc. in Computer Science

#### University of British Columbia

2019 Sept - Current Expected grad: 2024

- Dean's Honour Roll
- 87% cumulative average
- 91% average in CPSC courses