

Frank Fan

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Education

University of Waterloo

Master of Mathematics in Computer Science

Sep 2024 - Apr 2026 (expected)

- Advised by Prof. Gladimir Baranoski; GPA 4.0/4.0
- Thesis-based Master's student in computer graphics.
- Research interests: inelastic scattering processes in participating natural media.

University of Waterloo

Bachelor of Computer Science

2019 - 2024

Publications

Technical Report: A Study on Rendering Techniques to Visually Represent Sparkles [🔗](#)

2024

- Authors: Frank Fan, Gladimir V. G. Baranoski

Experience

University of Waterloo

Undergraduate Research Assistant

Waterloo, ON

Jan 2024 - Apr 2024

- Advisor: **Prof. Shlomi Steinberg**
- Investigated the implementation of a path tracer with UTD applications.
- Aided in an experiment analyzing the rendering of microsurfaces following a GGX distribution of surface normals.

University of Waterloo

Undergraduate Research Assistant

Waterloo, ON

Sep 2023 - Dec 2023

- Advisor: **Prof. Gladimir V. G. Baranoski**
- Investigated and compared various computer graphics techniques used in the simulation and rendering of the optical phenomenon of sparkles.

Rocscience Inc.

Software Developer

Toronto, ON

Jan 2023 - Apr 2023

- Developed algorithms to calculate numerical results - such as trajectory height, impact angle, kinetic energy heatmaps, and velocity - of physical simulations of collisions between falling masses and mesh surfaces. Engineered and integrated a new data structure model to store and manipulate these results.
- Designed the 3D visualization of spatial impact data between rockfall and barrier geometries for RocFall3 [🔗](#) using meshes from devDept Eyeshot's OpenGL wrapper.

Tactic Studios

Game Developer

Toronto, ON

May 2022 - Aug 2022

- Leveraged **Perforce** API to create a continuous integration tool that synchronizes branches and produces remote game builds by pushing baked data and content back to main.

Rocscience Inc.

Software Developer

Toronto, ON

Sep 2021 - Dec 2021

- Rearchitected a **spatial partitioning** system for dense polygon meshes to optimize **collision detection** between a point mass and the surface of a mesh.

PSI Technologies Inc.

Software Developer

Saskatoon, SK

Jan 2021 - Apr 2021

- Developed features in **C#** for the company's software utilizing the **.NET** framework for **WinForms** applications including a process that allows users to split a **devDept Eyeshot** model in any direction, showcasing a cross section of the interior of the model.

Projects

Stochastic Colloidal Particle Collision Simulator [🔗](#)

- Implemented a model that detects and treats colloidal particle collisions undergoing Brownian motion using stochastic techniques and Monte Carlo integration in MATLAB.

Ray Tracer [🔗](#)

- Constructed an extended, recursive ray-tracer in **C++** using **OpenGL** that includes features such as reflection, refraction, glossy reflection, glossy refraction, texture mapping, bump mapping, and stochastic anti-aliasing.

Technical Skills

Languages: C++17, Java, C, JavaScript, SQL, Bash, Scala, Python, MATLAB

Technologies: OpenGL, ImGui, Git, Perforce, Linux, PostgreSQL