Frank Fan

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Education

University of Waterloo
Masters of Mathematics   Sep 2024 - present

- Advised by Gladimir Baranoski

University of Waterloo
Bachelor of Computer Science   2019 - 2024

Publications

A Study on Rendering Techniques to Visually Represent Sparkles ⤴   2024

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

Experience

University of Waterloo   Waterloo, ON
Undergraduate Research Assistant   Jan 2024 - Apr 2024

- Advisor: **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   Waterloo, ON
Undergraduate Research Assistant   Sep 2023 - Dec 2023

- Advisor: **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.   Toronto, ON
Software Developer   Jan 2023 - Apr 2023

- Developed algorithms to calculate numerical results - such as impact height, impact angle, kinetic energy, and velocity - of collisions between falling masses and mesh surfaces. Engineered and integrated a new data structure model to store and manipulate these results.

- Constructed user-customizable 3D bar charts using meshes from **devDept Eyeshot**'s OpenGL wrapper as a vehicle for data visualization.

Tactic Studios   Toronto, ON
Game Developer   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.   Toronto, ON
Software Developer   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.   Saskatoon, SK
Software Developer   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/C++, Java, C, JavaScript, SQL, Bash, Scala, Python, MATLAB
Technologies: OpenGL, ImGUI, Git, Perforce, Linux, PostgreSQL