

# CUDA RAY TRACER (CRT)

## Project Abstract

Explore physically based rendering techniques involving ray tracing and accelerate the rendering algorithms with CUDA, and potentially utilize OpenGL. We plan to first follow through a CPU based ray tracing guide Raytracing In One Weekend and implement GPU-accelerated parallelization when possible, and utilize physics concepts to approximate a realistic image render.

Our objective is to implement features that bring us closer to a photorealistic render of an object i.e. a raytraced lighting/shading model, object material features, a camera/viewport to render the image, and post-processing features. We plan to support dielectric and/or metallic materials.

Implement Whitted style ray tracing algorithm to calculate the lighting. We can potentially use tiled matrix multiply for implementing 3D projection like perspective. Post-processing features like anti-aliasing and depth-of-field blur will probably use convolution.

We expect to speed up graphical rendering processes by utilizing the GPU when parallelization is useful/necessary. Hopefully the final product will be able to perform ray tracing and realistically render simple objects and materials.

## Group Member List

### Names:

- Raj Sugavanam
- Junseo Shin

No differentiation in roles is expected. We will simultaneously work on different parts of the implementation if needed, otherwise collaborate on solving one.