Chuyan Zhang

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Research Interests

Real-time ray tracing is still relatively limited in modern day games due to its high performance cost. From my perspective, two approaches can be taken to address this problem:

- reducing the complexity of the scene (**LoD and prefiltering techniques**),
- improving the efficiency of **sampling** (ReSTIR, path guiding, etc.).

While these are the two particular areas I am most interested in, my interests are also broadly distributed across various aspects of rendering, like **neural networks** as an effective method of compression and function fitting, and **3D Gaussians** as a potential unified geometry primitive to unify both surface and volume representations.

Education

University of California, Santa Barbara   Santa Barbara, U.S.
Master of Science in Computer Science   Sept. 2023 - Jun. 2025 (Est.)
advised by *Prof. Lingqi Yan*

Tsinghua University   Beijing, China
Bachelor of Engineering in Computer Science and Technology   Sept. 2019 - Jun. 2023
advised by *Prof. Kun Xu*

Publications

LuisaRender: A High-Performance Rendering Framework with Layered and Unified Interfaces on Stream Architectures   SIGGRAPH Asia 2022

In this work, we proposed a multi-backend, high-performance programming framework for general-purpose computing and rendering, and achieved unification of device-side and host-side code through embedding a domain specific language (DSL) into modern C++, and also provided multiple language bindings including Python and Rust.

Professional Experiences

Research Intern   Intel Labs
Visual Computing and Graphics Group   June 2024 - September 2024
worked with *Anton Sochenov* and *Gabor Liktor*

During this internship, I worked on an efficient level-of-detail (LoD) and culling algorithm with ray tracing acceleration structure. With a efficient cluster hierarchy for LoD selection and lazy, on-demand build for visible clusters, the algorithm can lower the geometry bandwidth each frame on real time ray tracers.

Professional Skills

- Programming

  I'm familiar with C/C++, Python, CUDA, Rust and GLSL (with Vulkan).

  I have worked on graphics toolchains and APIs like Vulkan and CUDA + OptiX, and I also have knowledge and experience with Machine Learning toolkits like PyTorch.

- Languages

  I am a native Mandarin speaker, and I speak fluent (112/120 in ToEFL iBT) English.