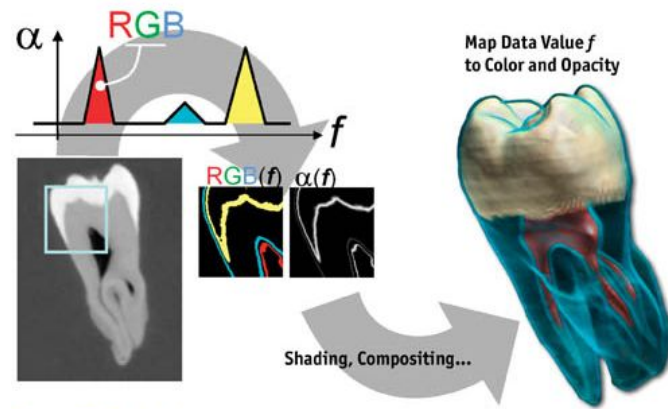
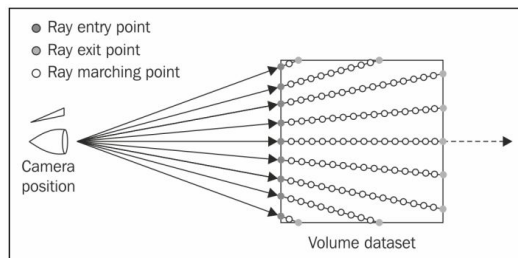


Fast Volume Rendering with Spatiotemporal Reservoir Resampling

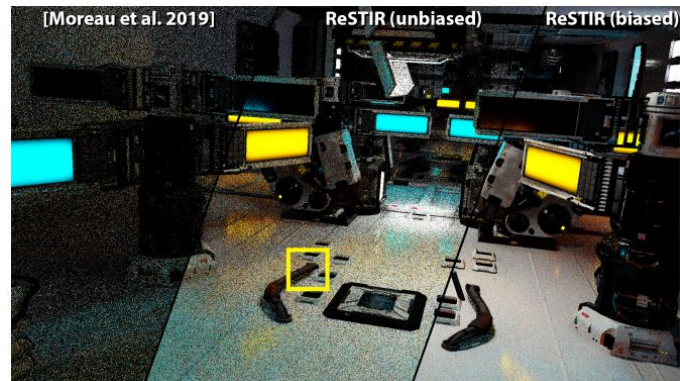
Zhihao Ruan (ruanzh@seas.upenn.edu)
Shubham Sharma (sshubh@seas.upenn.edu)
Raymond Yang (rayyang@seas.upenn.edu)

Since Last Milestone Pt.1

Overview of Volume Rendering

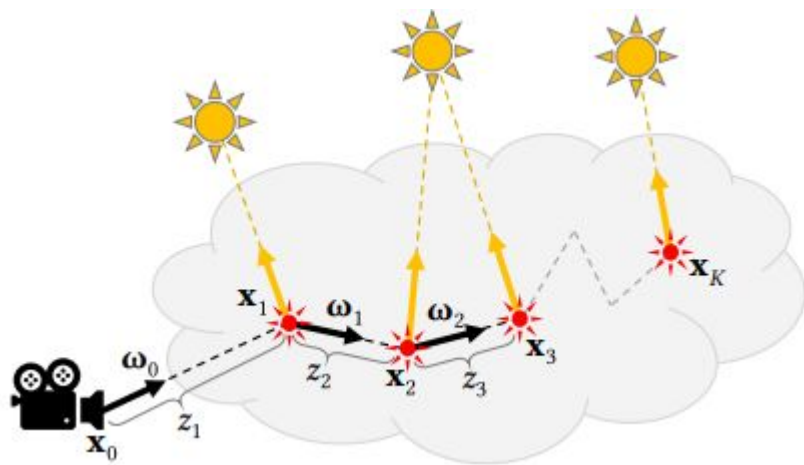


Overview of Spatiotemporal Reservoir Resampling

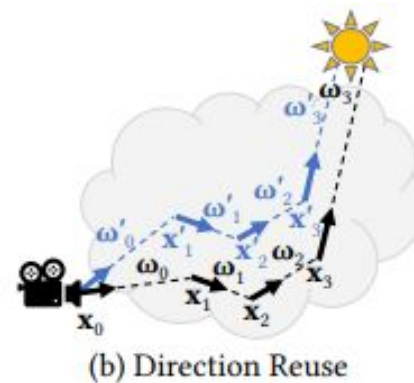
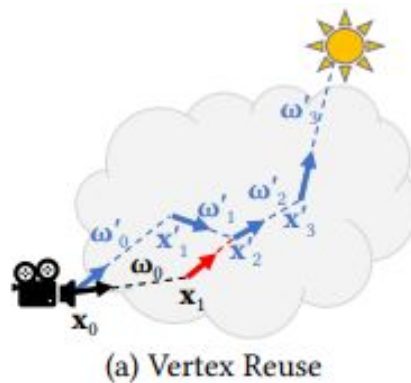


Since Last Milestone Pt.2

Overview of Fast Volume Rendering with Spatiotemporal Reservoir Resampling (Volume Rendering + ReStir)



Optimizations:



For This Milestone Pt.1

Vulkan Pipeline with VK-Bootstrap

- Optimizes Instance Creation, Physical Device selection, Device Creation, Getting Queues, Swapchain Creation
- Improves Enabling Validation Layers, Debug Callback
- Abstraction between physical and logical layer

OpenVDB

- Single threaded approach to extracting volumetric data

For This Milestone Pt.2

Vulkan Pipeline

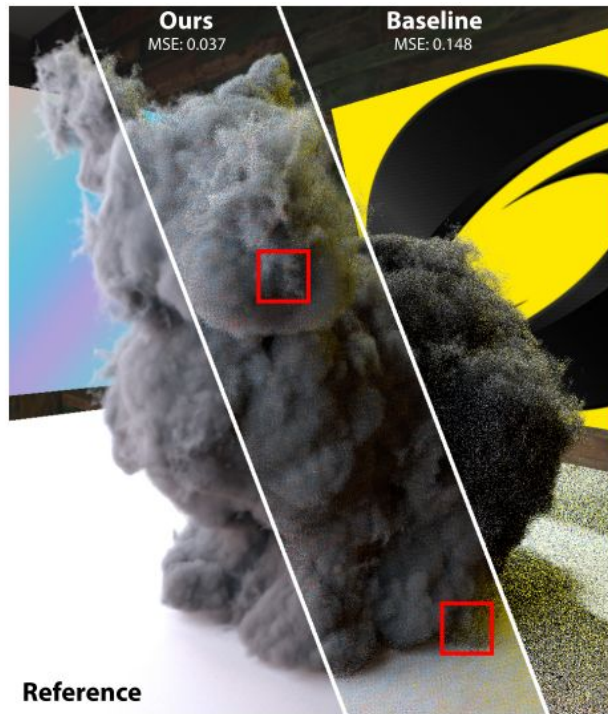


OpenVDB

```
Microsoft Visual Studio Debug Console
Testing random access:
Grid[1000, -2000000000, 3000000000] = 1
Grid[1000, 2000000000, -3000000000] = 0
Testing sequential access:
Grid[2147483648, -2147483648, -2147483648] = 3
Grid[1000, -2000000000, 3000000000] = 1
Grid[1000, 2000000000, -3000000000] = 2
Grid[2147483647, 2147483647, 2147483647] = 4
D:\Github\Volume-ReSTIR-Vulkan\build\bin\Debug\openvdb_test.exe (process 18938) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the console when debugging stops.
Press any key to close this window . . .
```

For Next Milestone

- Concrete understanding of Restir and Volume Rendering + ReStir
- Implement a basic Fast Volume Rendering with ReStir with working toy example



References and Credit

- [1] [Volume Rendering](#)
- [2] [Volume Rendering \(Nvidia\)](#)
- [3] [Fast Volume Rendering with Spatiotemporal Reservoir Resampling](#)
(SIGGRAPH 2021)
- [4] [Spatiotemporal reservoir resampling for real-time ray tracing with dynamic direct lighting](#) (SIGGRAPH 2020)
- [5] [VK-Bootstrap](#)
- [6] [OpenVDB](#)