Travis Robinson
Project 7
OpenCL/OpenGL Particle System
CS475
Spring 2016

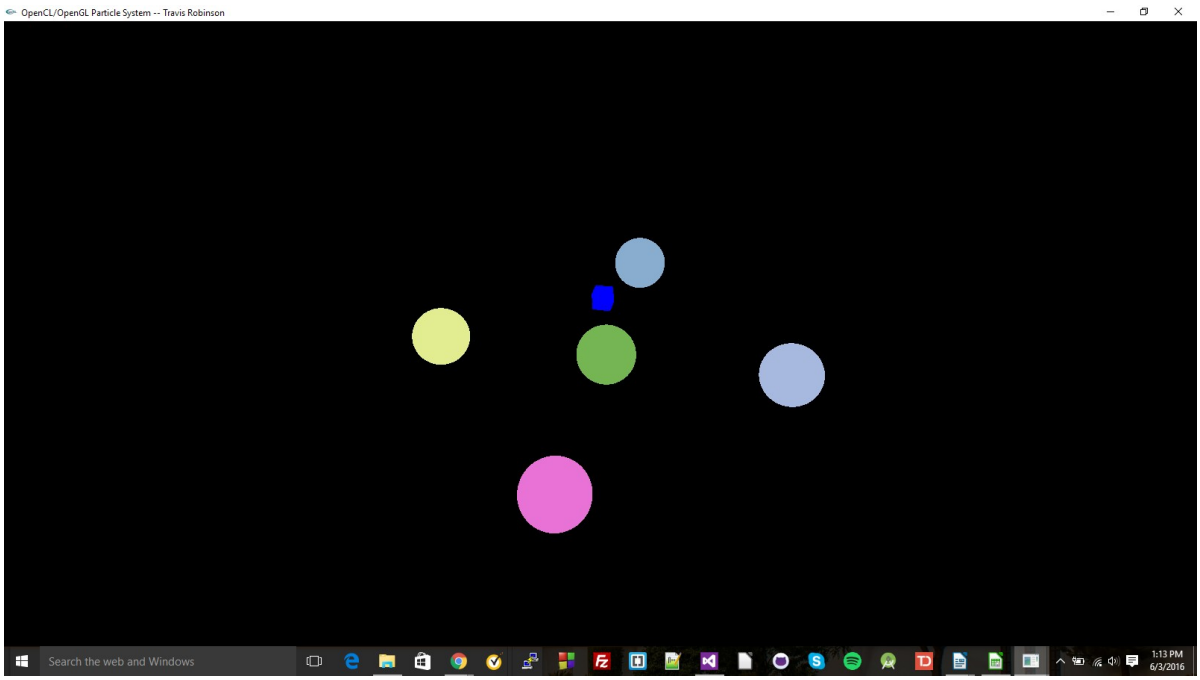
Project Computer

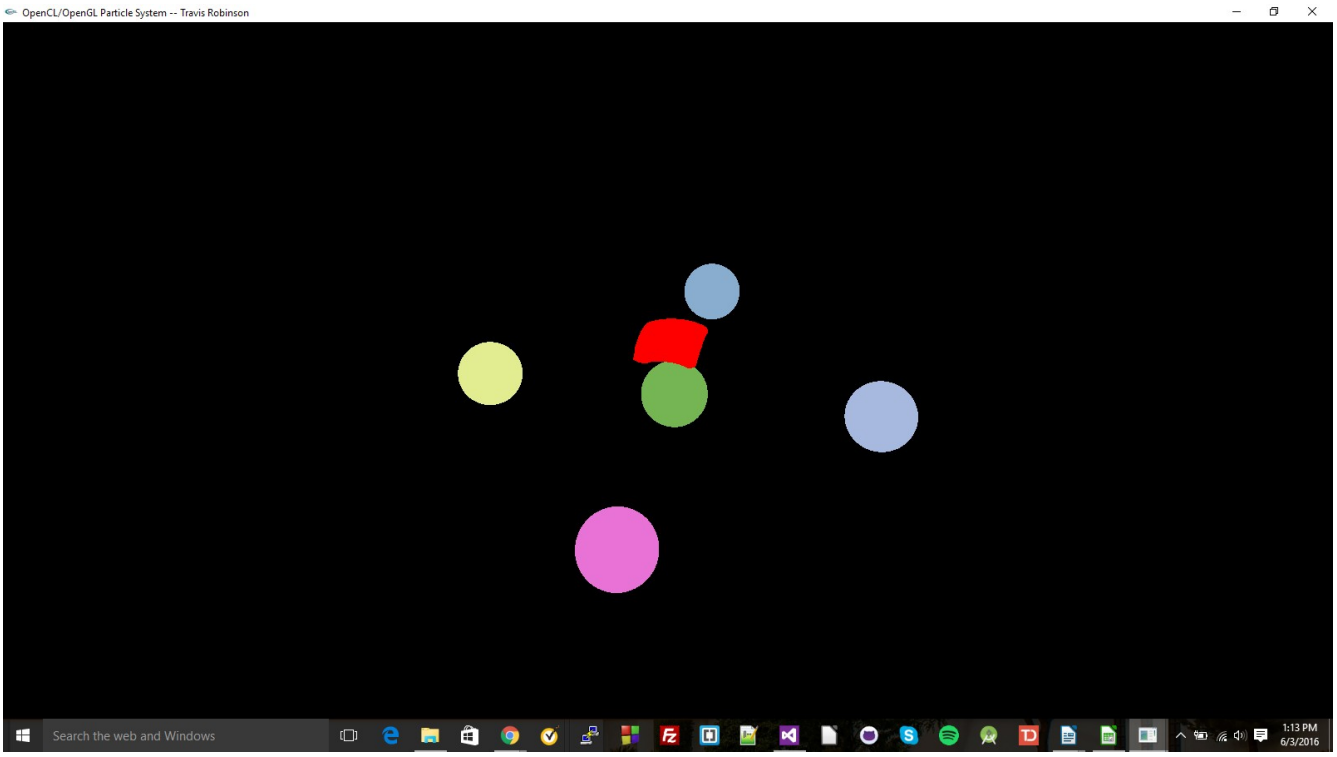
This project was run on my home laptop, an HP Pavilion dv7 with an AMD A8-3520M processor and an AMD Radeon HD 6620G GPU.

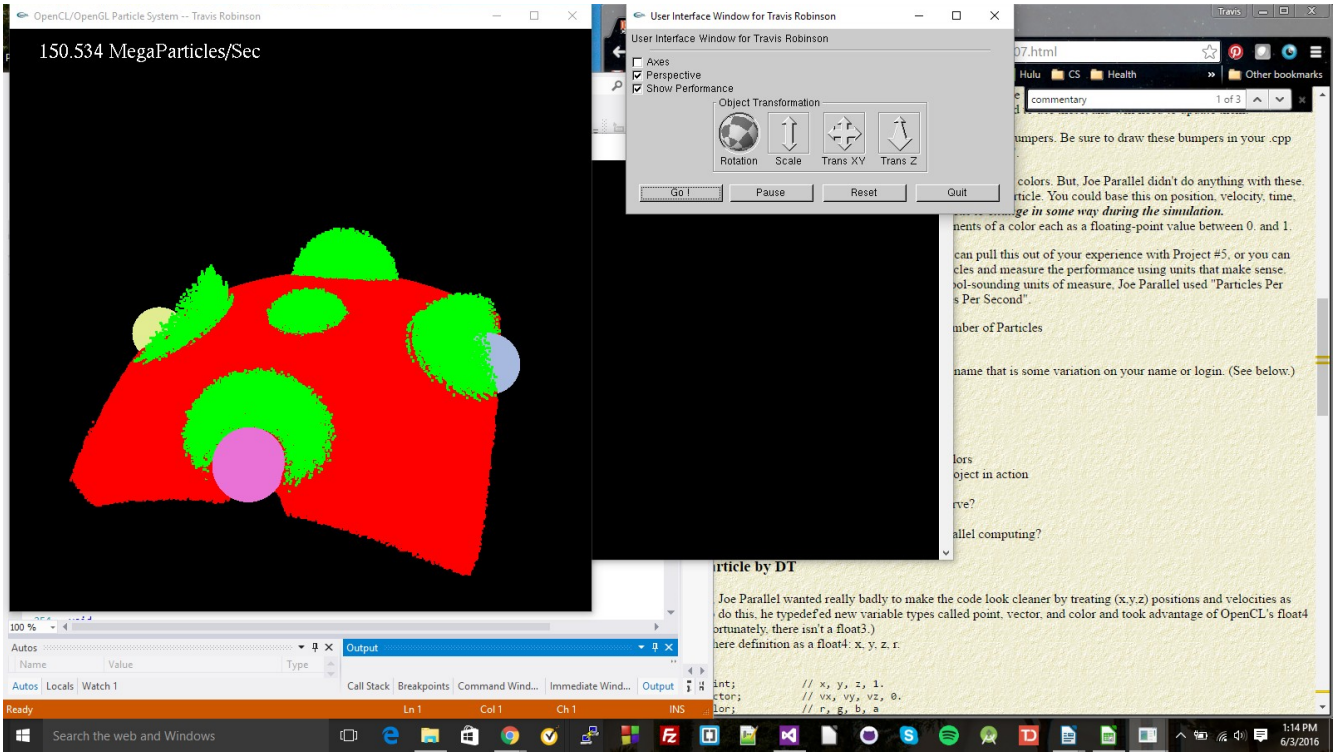
Dynamic Color Changing on Particles

For my particle colors, I set them to change color every time they hit one of the bumpers. They start off the color blue, then become red when the hit the first bumper, then green, then back to blue following the same sequence everytime they hit a bumper.

Screen Captures of Running Particle System




OpenCL/OpenGL Particle System -- Travis Robinson
Search the web and Windows
1:13 PM
6/3/2016


OpenCL/OpenGL Particle System -- Travis Robinson
150.534 MegaParticles/Sec
User Interface Window for Travis Robinson
User Interface Window for Travis Robinson
Axes
Perspective
Show Performance
Object Transformation
Rotation
Scale
Trans XY
Trans Z
Go !
Pause
Reset
Quit
Search the web and Windows
1:14 PM
6/3/2016

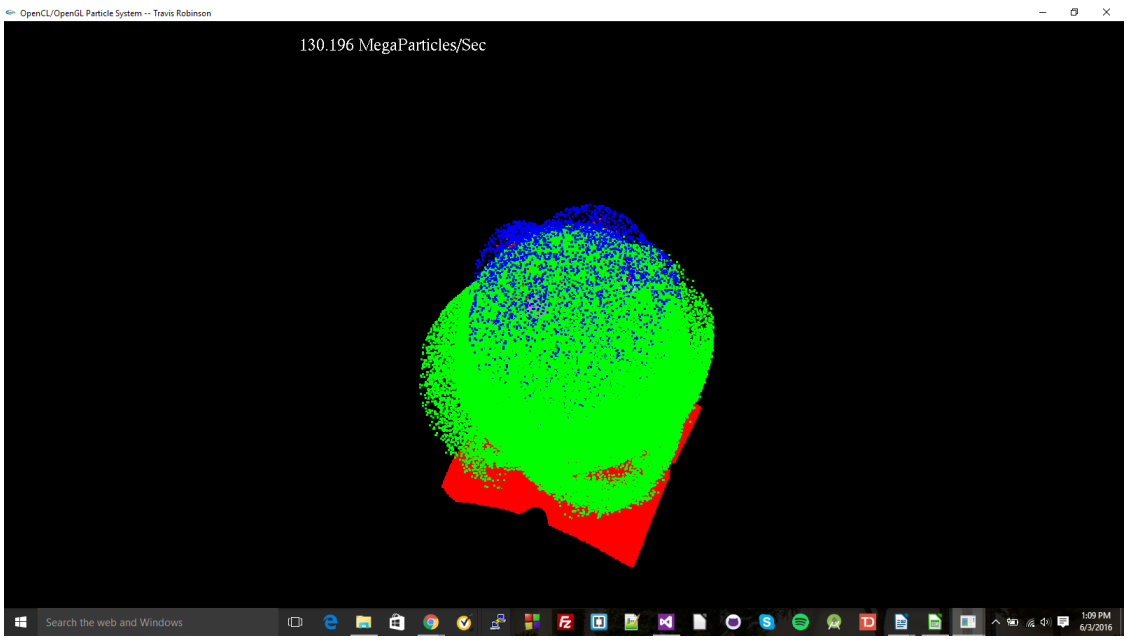
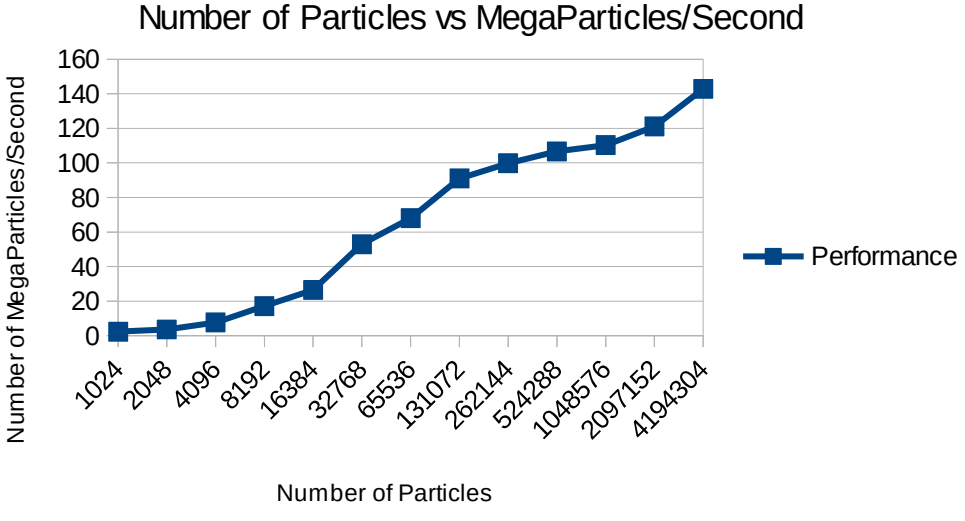


Table and Graph of Project Performance

Particles	MegaParticles/Sec
1024	2.314
2048	3.618
4096	7.644
8192	17.133
16384	26.45
32768	52.943
65536	68.012
131072	91.036
262144	99.852
524288	106.654
1048576	110.273
2097152	121.077
4194304	142.821



Patterns in Performance

We see in our performance that as the number of particles gets larger, our performance improves, though we do start to it beginning to level out after a quarter-million particles.

The reason for this is that as we get more particles, the GPU usage is being maximized. At lower particle counts, there's not enough particles for all of the GPU to be utilized, so it's making fewer calculations a second. As we increase the number of particles, though, we see performance increase because more of the GPU is being utilized. We eventually see it starting to level off because we reach the limits of what the GPU is capable of; each processing unit of the GPU can only process so many particles in a second, so having more particles won't improve performance.

What This Means For GPU Computing

What this means for GPU computing is that we'll get our best performance when using more particles/larger inputs, than we will when using smaller inputs. So for us to make the most of our processing time and our hardware, we should use larger amounts of data when doing GPU computing.