Demo Reel Breakdown

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1. PARTICLE GENERATION AND TEXTURING PIPELINE FOR STSCI
- Python/C++ Scripting, Look development on particles.

During an internship at the Space Telescope Science Institute (STScI), I developed a pipeline for rendering nebulae using large sets of particles. I have further refined this process over the course of my master's thesis, and extended it to galaxy visualizations as well. In order to generate the particles, I encased the original mesh in a bounding box, then voxelized and jittered to create an initial particle set. Using a probabilistic density function based on distance, the particles were culled and assigned a color from the texture map. By varying attributes like opacity, radius size, and noise, the cloudy feel of a nebula can be created. The particles were rendered using a Z-buffer based code developed by STScI.

2. "TRON VFX CHALLENGE"- LIGHTING, RENDERING, & COMPOSITING PIPELINE
- Group Project, Light Trail FX (Houdini), Lighting/Compositing (Maya & Nuke)

My coworkers and I created a small animation for an online TRON VFX Challenge. I developed the lighting, rendering, and compositing pipeline for the short in Maya and Nuke. I also created the light trails FX, using the "glow" textures of the characters as a map for the particle emitters in Houdini. The variety in the trails was achieved through multiple passes of particles. The rendered particles were composited into the scene using Nuke.

3. PHYSICALLY BASED SIMULATIONS
- C++/OpenGL Programming

This is a sequence of simulations from my Physically Based Modeling course at Texas A&M. All of the simulations were created using C++/OpenGL.

- **3A. Particle Fireworks:** I controlled the particles using different functions to create spider, horsetail, and disc fireworks.

- **3B. Flocking:** This flocking simulation contains 50 boids and 1 predator, which is attracted to the leader boid (green). The boids avoid both the cube walls and the predator boid. I then added an attractive point gravity source, causing the boids and predators to revolve around the central point. The flock accounts for group avoidance, centering, and velocity matching.

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- **3C. Springy Mesh:** This simulation uses cross springs to create and stabilize a springy cube mesh. Collisions are handled on a vertex-face case, and Euler integration is used to calculate the simulation.

4. "AFTER HOURS" LIGHTING

- Group Project, Modeling (Maya), Shading (Renderman/RSL), Character Animation, Lighting, Compositing (Houdini).

"After Hours" was created during a summer industry course in collaboration with Disney Animation Studios. As the look and lighting lead for our team, I organized the overall look development of the models and developed the lighting keys for the film to maintain consistency. For the final shot, I rendered the screensaver as a point cloud so that the scene could be illuminated by the light coming from the computer. Using a Disney technique, it was then used to create a separate pass of lighting that was layered into the composite in Houdini. I also modeled various office objects, created Renderman shaders, and animated the main characters in select shots.

5. C++/OPENGL RAYTRACER

- C++ Programming

This is a sequence of images created from the raytracer I built for my Image Synthesis class at Texas A&M. The raytracer can perform basic ray casting as well as final gathering algorithms like ambient occlusion and color bleeding.

6. TRADITIONAL ARTWORK

Various pieces of my personal artwork, including gesture, drawing, painting, and black and white photography.

More artwork, videos, and links to animation shorts available on my website: www.kendalllitaker.com.