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In this assignment, we rendered a man sitting on the moon (Fig.1).

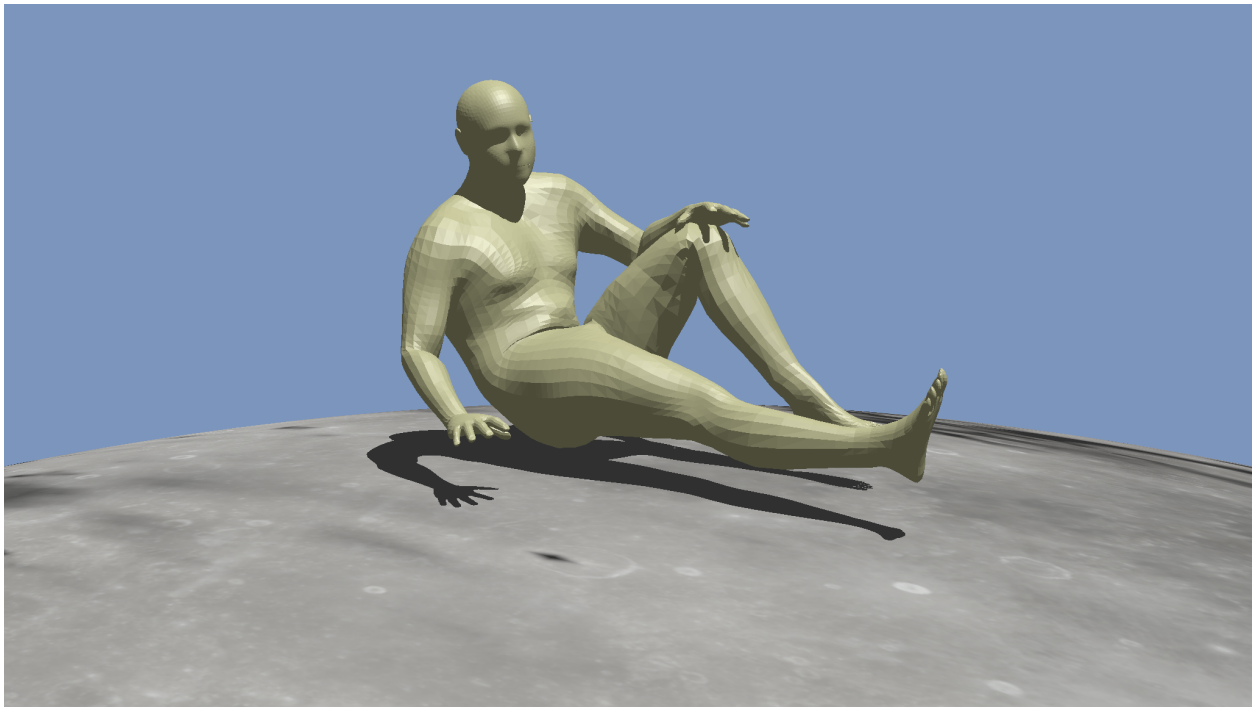

Fig 1. Man Sitting on the Moon.

The model of this human is adapted from the HumanShape Website (humanshape.org). Zixiang participated in the development of this website and the human models on it when he was an undergrad student, so we believe there are no copyright issues in it. The downloaded obj file is a little bit off standard (there are no uv coordinates in this obj file), so we have to modify the provided obj loader to read in the model (just deleted a few lines).

The human model contains 28850 triangles, so we implemented the acceleration of ray tracing using bounding volume hierarchy. It takes about 15 minutes to render a 1024*576 scene.

For the moon, it is a large sphere. We first implemented the diffuse texture. A color texture of the moon was found at the NASA website and applied here.

To make the moon look more real, we also implemented normal texture. The normal map can be found here. Because only a small portion of the moon is in the image, we also move the camera to a more remote location so as to show the whole shape of the moon (Fig. 2), which proves the functionality of our normal texture function.

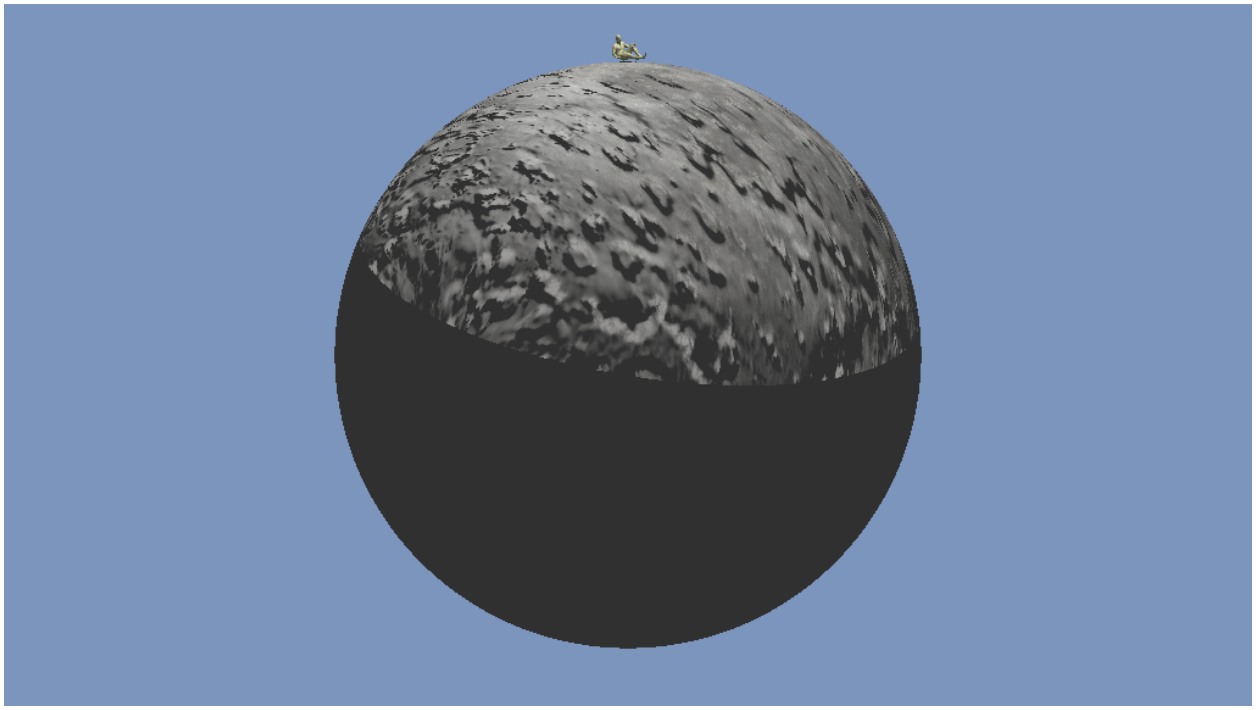

Fig 2. The Whole Moon From Remote Camera

The code for the human sitting on the moon is in the file “HumanShape.py”. We wrote a shell script “final_generation.sh” to generate the scene. The code for a whole moon is in the file “moon.py”, and “generate-moon.sh”.

To sum up, we modified the obj file reader a little bit (just deleted a few lines), implemented bounding volume hierarchy to accelerate ray tracing, and added both normal texture and defuse texture to the sphere.