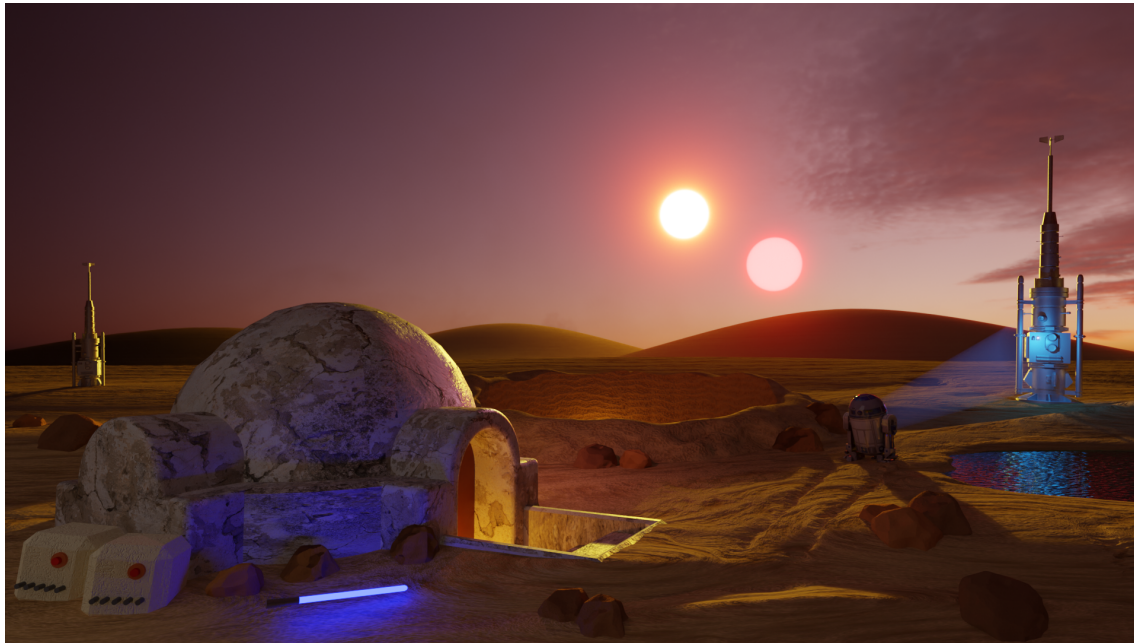


CS 148 Final Project Report  
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Max Meyberg

We recreated the very famous binary sunset from *Star Wars: A New Hope*. This scene takes place in the desert-like planet Tatooine, showcasing the hut-like house of Luke Skywalker.



## **Project Requirements**

We met the project requirements in various ways. This is how we met the requirements for each component:

### **1. Ray Tracing Requirements**

The project is rendered using the Cycles engine. The project contains many different light sources that showcase the power of ray tracing. The lightsabers produce a bright blue light (using emission), which shows a bright blue color-bleed onto Luke Skywalker's house as well as the rocks nearby. The bright light shining from R2-D2, which is a custom-made cylinder geometry that has the emission property and has been stretched in its end, is reflected across the body of water and heads toward the moisture evaporator tower. The light inside of Luke's house as well as the light from the crater-like structure reflects across the rocks and sand. The HDRI image provides ambient light to the whole scene. The geometry of the scene (with the exception of the sand dunes in the background) are all contained in a principled-volume "fog", with a deep red color to give the red sunset atmosphere. This fog causes the light from the two suns to scatter and give the glowing look of a sun, which lights up the whole scene in general. This fog also gives the sand dune a sunset glow and gives the objects in the scene shadows. Other minor light sources include a point light, where its source is actually invisible but causes Luke's home to have a slight red glow, mimicking some reflection from the red sun. There is also an area light to shine Luke's home more.

### **2. Main Geometry From Scratch**

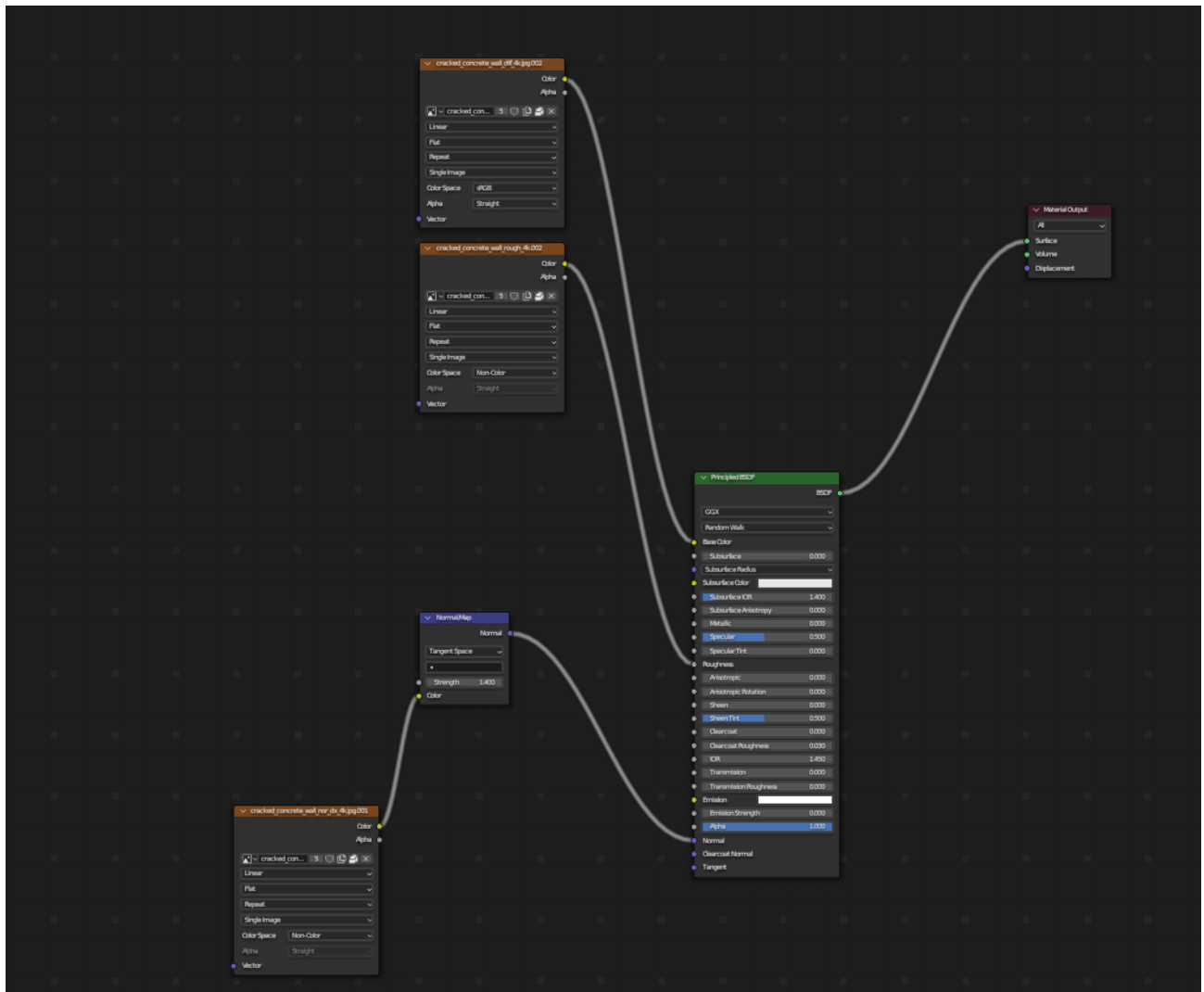
Luke's house is all made from scratch. Luke's house is made up by a sphere, intersected by three volume shapes, in which the main one in the front is composed by stairs that go underground and lead to the entrance door, which is also made from scratch. The geometry for the whole terrain is made by scratch, including the sand dunes in the background made in the sculpt mode, the various rocks, and the body of water. The Star Wars boxes are made from scratch, with multiple tiny cylinders that make up the buttons. The crater-like structure behind Luke's home has been made using Blender's Ant Landscape and then heavily modified using the boolean modifier. The only geometry imported are R2-D2 (but not the light that it shines, which has been made from scratch) and the two moisture vaporators (one in front of the body of water and one on the background left of the scene).

### 3. UV Mapping and Texturing From Scratch

Several objects in this project contained custom texturing.

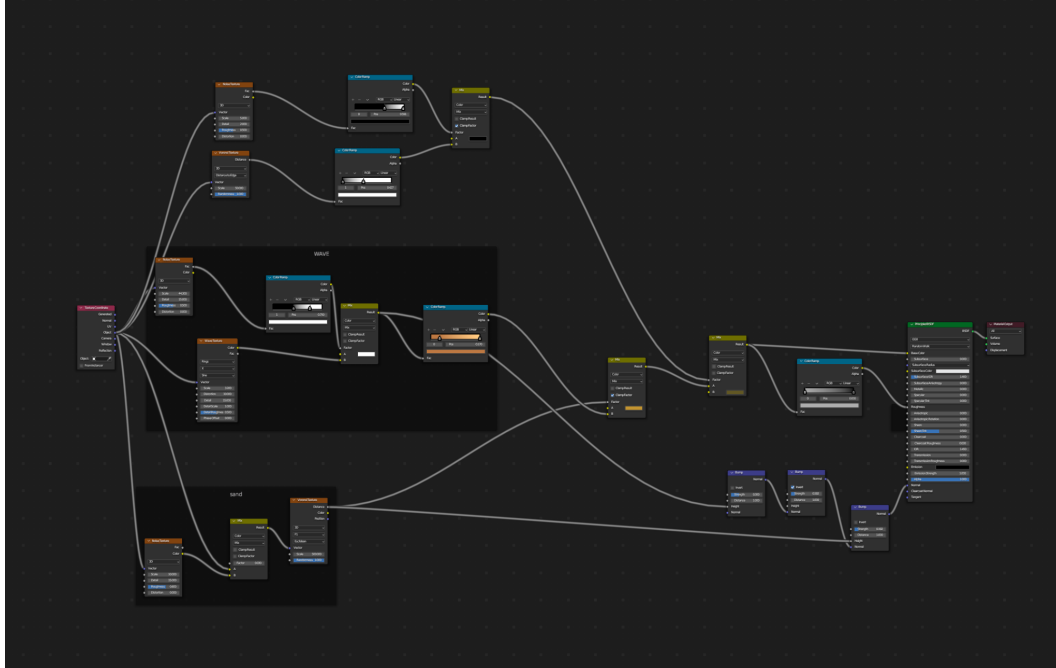
#### House Texture

The house texture relies on UV mapping using several imported images to modify the base color, roughness, and how bumpy the house appears, utilizing methods talked about in HW8.



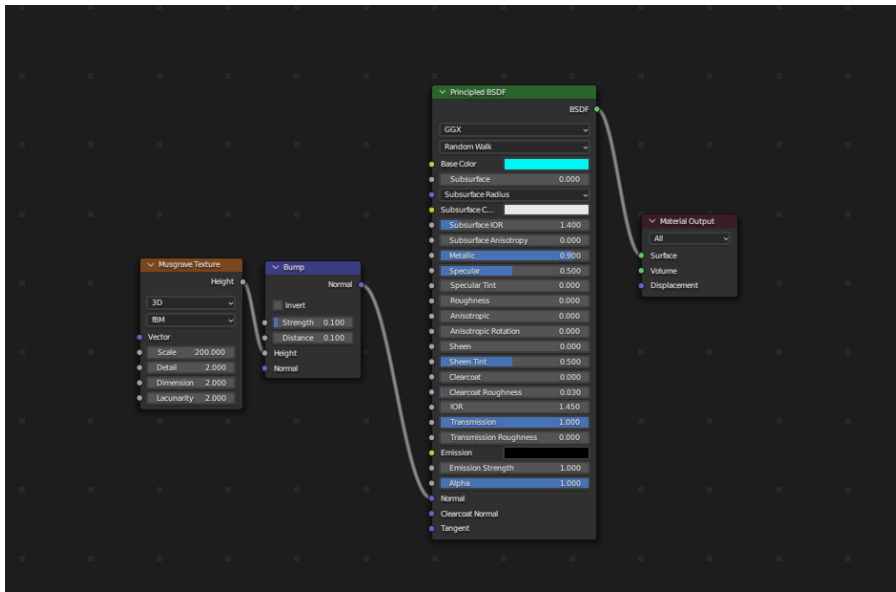
## Sand texture

The sand texture does not utilize UV mapping. Instead, it uses the Blender nodes to create the texture from scratch. As described below, a YouTube video was utilized and modified to fit the project.



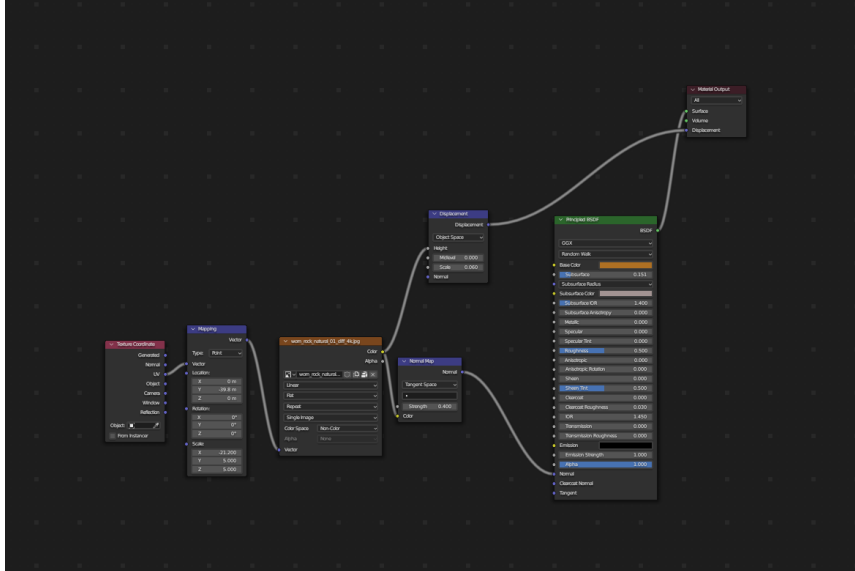
## Body of water

The body of water was made from scratch without relying on an external image.



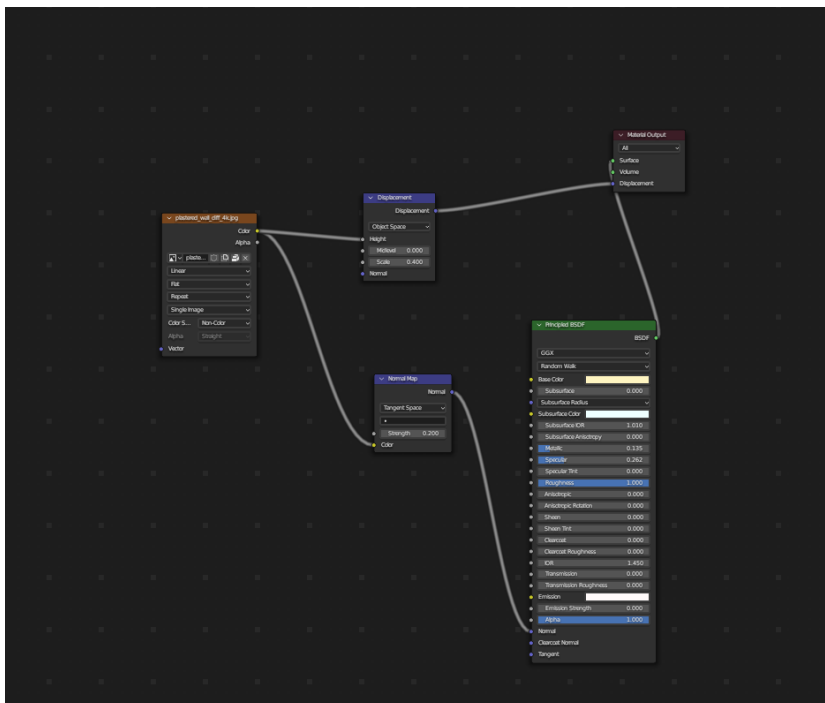
## Rock texture

The rocks utilized UV mapping with an imported image. Followed a YouTube video (referenced below) to learn how to make a rock shape, but then implemented UV mapping using the techniques described in HW8 (utilizing the normal map and displacement).



## Box Texture

The boxes were implemented using UV mapping on an external image, in addition to a similar method described in HW8.



#### **4. Blender/Cycles Advance Features**

Like described earlier in “Ray Tracing Requirements”, the camera (as well as most of objects in the scene, with the exception of the sand dunes in the background and the two suns) are all placed in a volumetric volume to be able to show a realistic red atmosphere as well to cause the light from the two suns to scatter and create a more realistic glow effect. In addition, since the scene utilized a volumetric effect, denoise was implemented to reduce graininess, as described in HW7.

#### **Group Contributions**

**Max** - Worked on initial renditions of volumetric effect with the two suns. Unfortunately, Max had a medical emergency around week 5 (Pancreatitis), which had lasting effects on his physical and mental well being. When he got back to campus, he worked on finding various assets R2D2 and the moisture vaporizer tower and placing these assets in the scene. However he made significant contributions towards homework assignments as well as helping find various YouTube tutorials and assets online, allowing Alberto to better focus on the final project. Max made the lightsaber. In addition, Max assisted Alberto on the UV mapping for the rocks and the boxes, and helped Alberto with the sand dunes in the background. Together, Max and Alberto also strategized what geometry the scene would contain.

**Alberto** - In addition to working with Max on everything described above, Alberto was responsible for building the geometry made from scratch, including Luke’s home and the crater-like structure behind Luke’s house. Alberto implemented the different textures and materials in the scene (including the sand texture and sand dunes in the background), the different light sources (excluding the lightsaber), as well as the body of water. Alberto also added a red atmosphere in the sky, and refined the position of the two suns.

**Assets:**

[https://polyhaven.com/a/cracked\\_concrete\\_wall](https://polyhaven.com/a/cracked_concrete_wall)

(Luke Skywalker's Hutt Texture)

<https://sketchfab.com/3d-models/star-wars-moisture-vaporator-85db11ecf43140cc923bdd3d33af1f5a>

(Moisture Vaporizer Tower Asset)

<https://sketchfab.com/3d-models/r2-d2-0f9760c4e566442ca80e2fc7e2faa0d>

(R2D2 Asset)

[https://polyhaven.com/a/belfast\\_sunset\\_puresky](https://polyhaven.com/a/belfast_sunset_puresky)

(HDR Image)

[https://docs.blender.org/manual/en/latest/addons/add\\_mesh/ant\\_landscape.html](https://docs.blender.org/manual/en/latest/addons/add_mesh/ant_landscape.html)

(Blender's Ant Landscape)

[https://polyhaven.com/a/plastered\\_wall](https://polyhaven.com/a/plastered_wall)

(texture for the two boxes next to luke's house)

[https://polyhaven.com/a/worn\\_rock\\_natural\\_01](https://polyhaven.com/a/worn_rock_natural_01)

Texture for rocks

## **Tutorials:**

<https://www.youtube.com/watch?v=TLiybA8HV5c>

This is the tutorial for procedural sand. Used this tutorial as a starting point, then modified it.

<https://www.youtube.com/watch?v=i9c8mzs- -w>

We utilized just the beginning of this video to see how to create a rock shape in Blender, but utilized HW8 for the UV mapping

<https://www.youtube.com/watch?v=y7bH2bXKyTk&t=238s>

General guide on how to use ANT Landscapes. Didn't directly use this video for anything, but it gave us exposure to ANT Landscapes, which we later used to make the crater-like structure behind Luke's home.

<https://www.youtube.com/watch?v=JjGKPSkTwWk>

This is a tutorial on how to make an arch, which was extremely useful for Luke's house (especially for creating the volumes on the side of Luke's house)

<https://www.youtube.com/watch?v=SMIIzddICDg&t=114s>

This is a tutorial on how to use the boolean modifier, which was also extremely helpful for Luke's house to create more unique geometry.

<https://www.youtube.com/watch?v=56MiL2FX6fk&t=93s>

This is a tutorial on how to use the bevel tool to smooth out the edges in Luke's house.

<https://www.youtube.com/watch?v=qcjSF8Eofas>

This is a tutorial on how to hide a light source but still still show the light reflection of it.

[https://www.youtube.com/watch?v=MtlSIRh5r\\_E](https://www.youtube.com/watch?v=MtlSIRh5r_E)

This is a tutorial on creating realistic-looking water on Blender. Even though some nodes ended up being different compared to the tutorial, this video was definitely useful for us to get started.

<https://www.youtube.com/watch?v=TJAs395KaBU>

This is a tutorial on how to create sand dunes. Even though the project ended up taking a different approach by relying on sculpt mode instead of relying on displacement (like in this video), this definitely was useful for us to get started.