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Jacob's Dream 3D Recreation Postmortem

Caleb Martin

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Jacob's Dream 3D Recreation Postmortem

Honors Project Thesis

Presented to the Honors College

Abilene Christian University

In partial fulfilment of the Honors Associate Distinction

By

Caleb Martin

Abilene, Texas

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This Project Thesis, directed and approved by the candidate’s committee, has been accepted by the Honors College of Abilene Christian University in partial fulfilment of the requirements for the distinction

Honors Associate

Dr. Jason Morris, Dean of the Honors College

Date

Advisory Committee

Dr. Brian Burton, Committee Chair

Dr. Brent Reeves, Committee Member

Rich Tanner, Committee Member

Dr. John Homer, Department Head
Abstract

This study attempts to give an honest post-mortem review and critique of the Jacob's Dream 3D Recreation project. The object of this thesis was to observe the effectiveness of transferring a physical three-dimensional work of art into a digital realm. The subject in this case was the Jacob’s Dream statue and garden located on Abilene Christian University’s campus and created by Mike Maxwell. Taking certain creative liberties and risks, various methods of transfer were considered. As well, the project explored different aesthetically pleasing techniques and devices for use in this artistic recreation, but special care was taken to protect the creator’s original vision and intention for the statue.

KEYWORDS: Game, Postmortem, 3D, Digital Scanning, Jacob’s Dream Sculpture, Unity, Maya
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Tooling

Before beginning this project, I had experience using both Autodesk Maya and Unity, so using these programs were a natural fit. Maya provided the ability for precise measurements of the recreation, and Unity made it possible for rapid prototyping. As well, in addition to using Unity and Maya, several assets were imported from the Unity Asset store.

**Maya 2016**

- Preferences—Units—Centimeters → Feet
- Layers
  - Sculpture—Intended only for the centerpiece of the Garden. This includes the statue, base, and surrounding stone pillars.
  - Path—This layer is intended for marking the paths and outer ring of the piece. It sets boundaries as well as pathways a distinctive shape and texture.
  - Trees—Trees fall into a more miscellaneous category as they are not the central part of the piece. Nevertheless, they are still necessary for reference and aesthetic. They are given their own layer for this purpose, but any trees will likely either be imported from the Unity Asset store and built directly in Unity.
  - Hill—The Hill, similarly, is a necessary layer to have in Maya. Though it amounts to not much more than a simple plane, having it
as reference to size and scale plays an important role in the project.

The final version of the hill will likely be crafted in Unity itself.

- References—This layer is for all the pictures used as references.

Unity 3D

- Workflow—This program allows for rapid prototyping. As well, its simple user interface and drag-and-drop features make it an easier 3D development software compared to other programs.

- Asset Store—The Unity Asset Store allows for the possibility of a light workload, as not all models, textures, and shader will need to be directly made by hand.

Brainstorming

There were a few different methods considered for the project. Being such a large endeavor, both 3D scanning using drones and traditional modeling methods were considered. Several factors were weighted against each other for each of the options until a reasonable conclusion was reached that would be both technically possible and visually sound.

Method 1: 3D Scan

The first method of proposal would be to take a drone and capture hundreds to thousands of images of the Jacob’s Dream statue and gardens. With this method, having a to-scale working model and environment would be a
guarantee. The models would be photorealistic and almost indistinguishable from real the life.

Unfortunately, there are a number of obstacles that prevent this method from becoming the most viable option. The time of day to take the pictures, the scale of the work, and patching pictures together would all need to be considered.

The mere scale of the scan would need to be life-sized. It is likely that the possibility of error would also scale as the size increases. I had considered scanning only a scale model of the statue that had been used during the statue’s creation. However, there were significant differences made to the statue in between the model and life-size version. Additionally, in the end, a copy of the model could not be located.

Prior to beginning the process, a company by the name of Captured Dimensions had already gone through the work of scanning the scale model of Jacob’s Dream. I attempted to contact them but received no response.

**Method 2: Photorealistic 3D modelling**

The second method that was entertained was the traditional AAA workflow for creating realistic models, textures, and environments. Using high-end game development programs like Maya, ZBrush, and Substance Designer, the project would have the best-looking version of the project. Unfortunately, this method would be completely unrealistic given the time constraints, available resources and man hours, and my own skill level.
Many resources would be outsourced from the Unity Asset store in order to expedite the process, but it still would not be enough. As well, given the budget of virtually zero dollars, buying so many models, textures, and assets would not be feasible.

**Method 3: Stylized 3D modelling**

Finally, I settled on a method. The model needed to be aesthetically pleasing, not merely graphically impressive. The models would be simplified, adapting a low-poly style. This allowed for extremely fast prototyping and building of the models and other assets.

After which, the models would be placed inside Unity and given special treatment using shaders, anti-aliasing and other coloring effects to make the whole of the environment more pleasing to the eye. This is the most realistic and accomplishable of the project methods.

**Process**

Despite planning, the process for this project took some unexpected turns as all projects do. The work evolved through many iterations and adjustments as particular voice began to emerge from it according to the creators original intentions for the sculpture and garden. Many different parts of a large environment eventually came together.
Schedule

- Interview Jack Maxwell about his dream and vision for the statue.
- Take photos of the statue and surrounding gardens.
- Use the references to model in Maya.
- Export various individual models to Unity.
- Build scene in Unity to scale and enable first person perspective.
- Enable VR capabilities within Unity.
- Include any additional variations as suggested by Jack Maxwell.
- Publish finished product online.

The first part of my project was to interview Jack Maxwell and ask for his take on the work he created. He had many suggestions for the project, and even suggested making the environment functional in a mobile app or even AR functionality. In addition to these ideas, he talked about how much he wanted to tell people about all the little intricacies of the project, and how you can’t say everything in simply one sculpture and a plaque. So, it was my idea to include in this project the addition of several pop-up text boxes that display behind-the-scenes information about the details of the project and its development process.

The initial plan for the project was to take a drone and digitally scan the whole of the environment into Maya. From there I would patch the different pieces together and place into Unity to be viewed as a virtual reality experience.

It was during this time that an important realization occurred to me. After taking reference photos for the project, it became clear that using these images
for textures would not work. The pictures taken would be limited to a single time of day unless under extremely special circumstance.

Due to the scale of the outdoor environment, it would require that the photos be taken across several days. Across those days, the lighting and shadow would need to be nearly identical to stitch the photos together. In addition to the additional work and possibly lengthened schedule, the aesthetic of the digital result would be limited to a specific look, restricting creative options. The entire scene could only have one light source, for better or worse, and special attention to detail with regard to lighting would be impossible.

With that information I resolved to model it more individually in a more handcrafted style. While photorealism will not be achievable, this makes the project much more manageable on a time scale. As well, it gives me significantly more creative freedom in crafting the style of the project.
After the interview, the creation of a project structure was in order. In order to save on time, some of the more repeatable assets were bought from the Unity Asset Store.

Before production began, I needed to take a large amount of reference photos. Hundreds of photos were taken of every rock, flower, and crevice. Photo days were divided accordingly: Miscellaneous overarching, rocks, pillars, sculpture, gardens and trees, pathways and hedges, lighting.
The actual geometry would be fairly simple with a few bevels and cross cuts into the stone. Textures will rely heavily on reference images, though ultimately will come to a more hand painted style. In engine, the final look and appeal came down to shaders. Shaders, in my experience, are a quick, easy way to bring something from halfway decent to simply stunning. Naturally, a large portion of time was dedicated to evaluating options in regard to Unity shaders.
Once the models were completed in Maya and exported to Unity, the final process began in arranging the individual rocks, paths, and pillars into their assigned location based on the many reference photos. This stage of the process went through the most alterations and could win an award for most tiny single adjustments.
The scene was ultimately brought to life to a limited degree of success. An accurate portrayal of the gardens was reached, and sufficient progress and data was retrieved to allow for further development in the future if that is the desire of myself or the members of the committee. Though not all the bullet points could be checked off, this project has served as an excellent exercise in artistic expression.

What Went Well

There were a number of speed bumps, but several parts of the process ended up working better than expected. For example, integration into Unity was a breeze. Transferring each of the exported models from Maya into Unity proved to be much easier than previously anticipated, and the layer and data from each model could be kept completely.
As well, working within Maya, itself, flowed naturally. With the proper set up of the different layers for reference, and the changes to unit measuring system, working in Maya worked like clockwork. As a result, the scale of the project and the reference photos taken lined up perfectly with the real world. Only slight adjustments needed to be made when transferring the models to Unity.

Finally, due to what was mentioned previously, I think I can safely say that I was able to at least begin to catch a glimpse of Mike Maxwell’s vision for the statue and garden. Maintaining his original vision for the project was of utmost importance to me, and if nothing else, I wanted to make for certain that aspect of the project was accomplished.

**What Didn’t Go Well**

Looking back, there are a number a processes and strategies that I would have done differently. Being a artistic interpretation of a geographic feature, I decided to take a artistic approach, working on all of the parts at once, and steadily adding in detail. For a smaller project with no timeline this may have been feasible. Ultimately it was a mistake, however.

Instead, I would have started as Mr. Maxwell began: With the centerpiece. Had I done it differently, I would have focuses solely on the sculpture itself, as that is the most important part and the most difficult to complete. This change would become a significant restructuring of the entire project timeline. As you can see, this mistake goes down to a fundamental level.
Additionally, attempting to use an additional Unity application, Probuilder, to cover up some of these mistakes ended up proving to be more trouble than help. It was a Band-Aid on a larger wound that kept peeling off.

Finally, if I do things differently, I would not have attempted to accomplish such a monumental task on my own. This is a project that is perfect for a team of people, not just one. While it is important to take initiative and responsibility, it is also imperative to divide the work and delegate to those who are most fitting for the job.

What’s Next

There are a number of lessons to take away from this for future endeavors. First, I would start with the biggest obstacles in the project first. With no other part of a project being a guarantee, it should be championed to get the most important objectives out of the way first.

Next, I would get assistance when needed. The delegation of duties to other parties is almost as important as the delegation of time. Both are crucial to a project’s success.

Finally, I would set clear goals and boundaries for all future projects. Reasonable goals were made for this project, but boundaries and limitations were never clearly stated until it was too late. That ended up being a significant factor in how the rest of the project pieced itself together moving forward.
I will continue to work on the project and bring up Jack Maxwell’s vision. Once minor changes have been made, this will likely act as a portfolio piece and subject of study for those who are interested. It may even be published one day as a standalone game or integrated in to an ongoing virtual campus project.

The Dream Behind Jacob’s Dream

This is the original inspiration for the recreation of the statue, Jacob’s Dream. The insights Mr. Maxwell gave into his process stand as a testament to the effort and care placed into the creation of this place. Every detail of the sculpture held a purpose and a story behind it. It was then I knew that this site was something special, something worth immortalizing in a digital environment.

Tuesday 8:30 p.m., Jacob’s Dream Sculpture Site

Jack Maxwell came out to Jacob’s Dream shortly after the sun went down. The lights were dim, so it was difficult to see the looming metal angels overhead. Nonetheless, Jack was able to paint a clear picture in my mind of the seven-thousand-pound statue and its surrounding area by describing in detail its construction and inspiration.

It all began in Nice, France. Jack and his wife, Jill, were visiting one of the cemeteries there. As they strolled through the graves they saw that many of the stones were mounted with stone angels, stained by the weather. Jack commented on how beautiful he thought the angels looked in all their natural
glory, stains, streaks, and all. For Jack that was the seed of inspiration, but he wanted to do more with the idea.

For Jacob’s Dream, Jack envisioned the angels as graceful, but also as strong, masculine figures akin to those described in the Bible. Tying this back to Luke, I think of something similar when I imagine an angel like Gabriel speaking to Mary or announcing the good news to the shepherds. Angels may be the messengers of the Bible, but they’re also members of the army of God.

The ladder has four angels adorned on its rungs, each of them appearing older in age as they near the bottom. Jack explained that symbolically the number four represented earth, so he thought it would be natural to have the effects of time on earth be more prevalent as the order of angels descended the ladder.

The limestone stones surrounding the angels were brought from Leuters, Texas. Jack wanted to make sure the stone was hard and durable compared to other limestone like that in Austin, Texas. Despite being brought from Leuters, the limestone was cut and carved on site. Maxwell himself sandblasted many of the bible verses seen in the stones. The bible verses that were cut are not any complete verse, but rather they are memorable tidbits of many verses relating to angels, gardens, and water.

Construction crews working on the installation were nothing short of crazy. Shortly before the piece was to be unveiled, its builders worked through the night on several occasions in order to complete it on time. The workers went above and beyond during its construction, and for someone like Luke, he would think
the workers would be very blessed indeed, as described by his beatitudes (Luke 6:20-26).

It was amazing to learn how God could work through art. From the planning to completion, there were more than a few tiny miracles along the way. There was constant prayer and praise over the course of its construction, but suffering and stress placed on the workers, planners, and Jack himself still caused its fair amount of strife. Nonetheless, the project was still completed, and I think Jack was very happy with how it turned out, even after so many long and sleepless nights.

You never know where inspiration will come from or how you will be called to serve the Lord. Jack’s dedication to the piece certainly mirrored the disciples’ actions in dedication to Jesus. Big things tend to happen when we put forth hard work, dedication, and little faith in His name.

Jacob’s dream stands as a monument to those dedicated to furthering God’s kingdom. As well, it serves as inspiration for future generations to follow in God’s footsteps. As I was listening to Jack speak, I realized the incredible details that went into such a massive project, and I saw God’s work in each of them. This revelation inspired and reminded me to dedicate my work to God and walk in the footsteps of Jesus.