Mastering Layman's LiDAR at Historic Spanish Point

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Marie Selby Gardens Historic Spanish Point

[86365] Independent Study Project: Content Creation and Virtual Exhibitions

Dr. Frederick Pirone

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The following renders were created using photogrammetry and LiDAR at Historic Spanish Point in Osprey, Florida. Historic Spanish Point welcomes citizen scientists to interpret the land in respectful and non-invasive ways. Across the mounds, you will find remnants of the various settlers of the land, like the Webb Packing House where citrus was packaged and distributed across Florida or the Edwardian aqueduct system built across the Hill Cottage Mound by Bertha Palmer in the 1910s. A story that has been nearly forgotten is the first structures ever placed on the land; that of the shell mounds constructed by the ancient Indigenous Floridians. Any traces of the ancient Indigenous people disappeared from Spanish Point sometime around 1100 AD. There is no evidence of European contact until the Webb family arrived in 1867. Since then, Spanish Point has had various owners, who have intentionally cared for and cultivated the land for their needs at the time.

Through creating virtual experiences using LiDAR and photogrammetry assets, we aim to preserve the full story of Historic Spanish Point; from the robust lives of the ancient indigenous peoples to today. Given more time, the assets below can be used to create virtual spaces that preserve the land and structures captured long after they are swept away by the sea. These virtual spaces could be used by Historic Spanish Point as educational tools to draw attention to the voices of the ancient indigenous people and the erosion of the mounds they left behind. These tools can be used at the park itself, educating the immediate community about the hidden history of Historic Spanish Point. They can also be used at events at other spaces to encourage tourist traffic to the park. Through the use of open source photogrammetry, LiDAR, and post processing tools, we were able to build our foundational methods that will be applied further in Spring 2024.

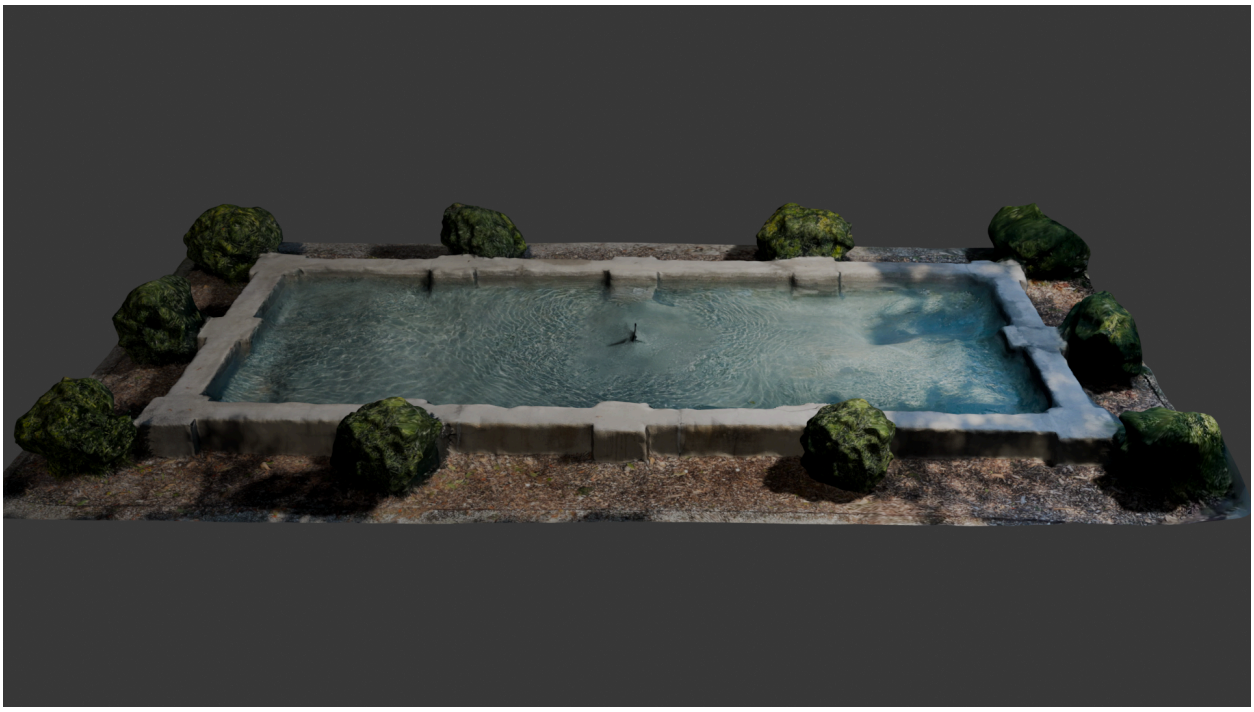
Photogrammetry Sunken Garden & Pergola Bench | Rendered in Blender |

Taken on January 08, 2024 at 11:00am

The Sunken Garden & Pergola was originally used by Bertha Palmer in the 1910s as a social entertaining space. The patina of the bench offered a unique opportunity to capture and process a structure within a natural landscape. This asset could be used to highlight Bertha Palmer's inspirations when constructing her gardens. Using an iPhone 12 Pro, a total of 306 overlapping images were captured to create a comprehensive digital model. These images resulted in a substantial dataset that was processed in Blender to achieve the high-resolution 3D representation above. The photos were captured on Auto mode in Polycam, meaning the app was detecting a fifty percent overlap between photographs and capturing the images for me. In my plan, I split the bench into three sections and captured them by moving around the bench. I made sure to take photos from many angles of the details I wanted to see in the final render, like the aged patina or the ripples in the columns.

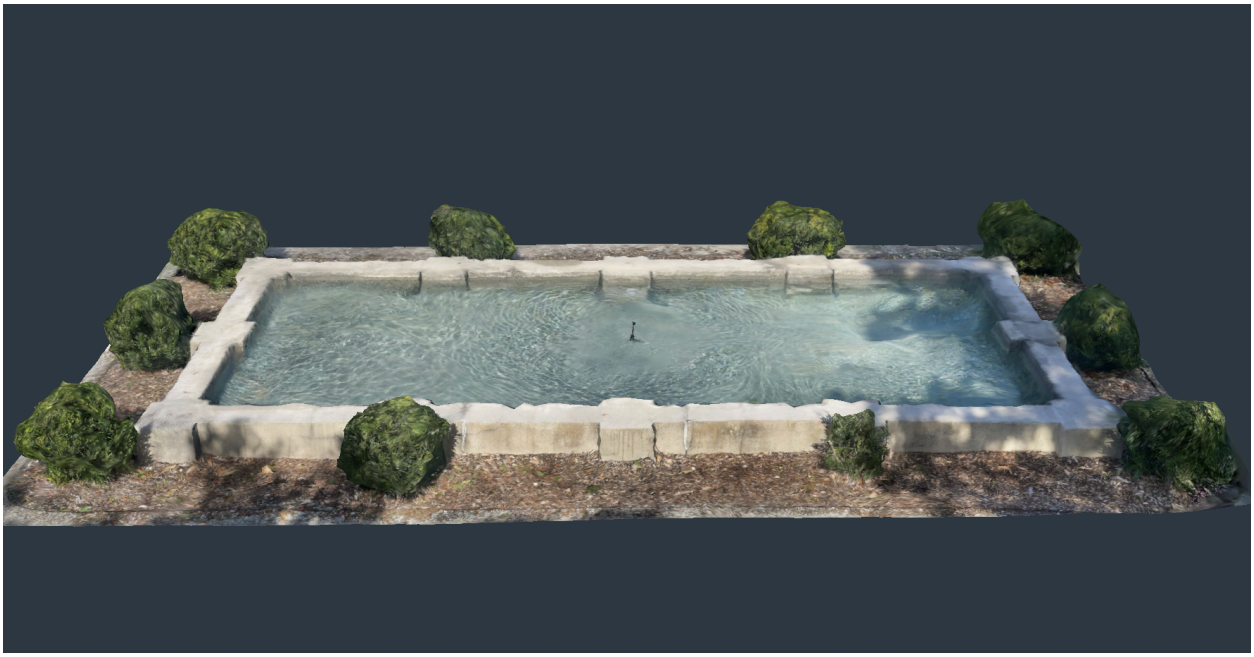
Photogrammetry Sunken Garden & Pergola Bench | Rendered in Blender

The scan was exported as an .obj file from Polycam and edited in Blender. In the post-processing phase in Blender, the render underwent a series of enhancements. The model's form was improved using a weld modifier to join broken vertices and a subdivision surface modifier to increase the amount of vertices in the render image. A boolean modifier was employed to excise unnecessary elements from the scan. Through the use of these modifiers and a few other tweaks, the shape and texture of the render matched its real world counterpart. Next, a point light was set above the bench to highlight the quality of the patina and engraving. Like mentioned before, this asset can be used to highlight Palmer's Roman and Greek inspirations for her gardens. It can also be used to highlight the Sunken Garden as a community space that is threatened by climate change and the forces of erosion.



Photogrammetry Sunken Garden & Pergola Fountain | Rendered in Blender |

Taken on January 10, 2024 at 11:00am



Photogrammetry Sunken Garden & Pergola Fountain | Processed & Rendered in Polycam