Virtualization of the Chiurazzi Sculpture Collection at the John and Mable Ringling Museum of Art

The Chiurazzi Fonderia was established in 1860 by Gennaro Chiurazzi. At the height of its popularity, the Foundry gained access to the sculpture collections of a variety of renowned museums such as the National Archaeological Museum in Naples, the Vatican Museum, the Louvre and many more for the purpose of taking moulds. It is this mould collection that gained Chiurazzi Fonderia a world-renowned reputation and made it possible to bring these replicas to museums around the world. The John and Mable Ringling Museum of Art in Sarasota, Florida currently owns 71 objects attributed to the Fonderia Chiurazzi. In the Fall of 2020, the University of South Florida’s Institute for Digital Exploration (USF IDEx) began a project in conjunction with the John and Mable Ringling Museum of Art to digitize these bronze sculptures. The purpose of digitization includes increased accessibility of these statues, which is pursuant to the Ringling Museum's Equity Statement. In addition, the digitized sculptures serve as a reference for an ongoing restoration project for the physical sculptures held at the museum.

In capturing the data for these objects, USF IDEx utilized handheld digital photogrammetry. This method was chosen due to the size and complexity of the object and materials. Due to the placement of some of the sculptures, there were a number of challenges faced during the capture of the data. Firstly, a majority of the sculptures are located in courtyard of the John and Mable Ringling Museum of Art. Thus, they are in direct sunlight. Depending on the time of day and the cloud cover, lighting was consistently changing. To solve this issue, USF IDEx planned to capture these sculptures in the middle of the day with the most consistent sunlight. Often, adapting to changing light was necessary by waiting to capture a statue until cloud coverage changed. Another issue faced was the sculptures up against the walls of the loggia or in corners. While some sculptures, such as Venus of the Grotticella, were place directly in the courtyard with sufficient space for IDEx members to fully circle around the object,
others were in more difficult spaces. Many sculptures were placed up against walls or in corners. The issue of the back side of an object would be handled in postprocessing. Other unique cases included sculptures that were life-size or larger and those that were placed on tall platforms. Thus, maneuvering was required to capture the entirety of the object, including the top of the head. To solve this issue, IDEX members used ladders to capture the entirety of the object.

To process the data captured using digital photogrammetry, most sculptures were processed in RealityCapture 1.0.3 with just a couple processed in Agisoft Metashape 1.6.2. This choice was made based on trial runs with both programs. Models produced in RealityCapture had less flaws in the mesh and texture than in Metashape. Thus, this was the program chosen to process remaining objects. In RealityCapture, images were aligned, then the model was calculated and reconstructed. Support and background materials as well as the concrete podium the statue was placed on were selected and deleted to leave only the sculpture and its base. The triangle count was set to three million and the texture was created. The few models processed in Agisoft Metashape 1.6.2 followed a similar workflow including aligning photos, building the dense cloud, getting rid of support and background points, building the mesh and creating the texture.

Due to the varying conditions of an outdoor setting and special cases, such as those objects against a wall, post processing was required for most models. Most of the post-processing occurred in Blender 2.90, 2.91 and 2.92. For all objects, a plane was placed beneath the base the sculpture as the bottom of the sculptures could not be captured. Further editing in Blender included mesh edits, which mostly entailed lightly smoothing the mesh. In addition, due to the consistency of the green grass and pink walls behind sculptures, texture editing was done to remove those imposed colors from the texture of the model.

Some sculptures required further edits to do minor reconstructions of the mesh. This usually occurred in sculptures that are placed against a wall at the Ringling Museum. Thus, the back of the sculptures in a similar predicament are not captured or are only minimally captured. For some of these sculptures, reconstruction of the back was possible. However, for the Laocoon, it was impossible to reconstruct the back of
the sculpture as it is placed in the corner of the loggia and data on the backside of the sculpture could not be collected at all. The choice was made to create a plane that is the same color as the walls of the museum and add it to the back of the model. This allows the model to be presented as the physical sculpture is at the museum without compromising a faithful depiction of the sculpture.

The metadata curation for this project came from a number of sources. Firstly, the John and Mable Ringling Museum of Art provided a number of documents to USF IDEX regarding the acquisition of the sculptures by John Ringling and their presence at the Ringling Museum. The metadata contained in these documents is often data consistent with the Ringling e-Museum. In addition, the Ringling e-Museum was used for general metadata such as dimensions and provenance. Another source of information about the foundry itself is business and contract documents. One in particular, an 8-K Form Current Report from sale of the business in 2013, provides a great deal of information about the mould collection, museums the Fonderia Chiurazzi partnered with, the establishment of the foundry, information about the unique moulding process employed by Chiurazzi and the history of ownership as it was passed down within the Chiurazzi family and eventually sold to external companies. While the documents do not account for each and every mould and cast, it provides a general overview to aid in the metadata curation.

Finally, a number of sources were utilized to provide information about the original sculptures. The Ringling e-Museum often provided reference to the current holding location of the original sculpture. Thus, one source used was the websites of these institutions. Other sources include Carol Mattusch and Henry Lie’s book *The Villa dei Papiri at Herculaneum: Life and Afterlife of a Sculpture Collection*, given that many of the Chiurazzi casts at the Ringling are Hellenistic or Roman in origin. After the models were created, extensive database entries were created for each model that included both metadata and paradata information following the standards set forth by the Dublin Core metadata model with minor adjustments. Dissemination of the models began with uploading the models to the USF IDEX Sketchfab page as a living collection. The online collection includes 24 models. In addition to Sketchfab, the models have also been disseminated on the USF IDEX website as a virtual collection.
Here, the models are presented with thumbnails providing accurate 2D representations of the objects. Each thumbnail is linked with a PDF output of the database as well as the Sketchfab link to view the 3D model. The PDF report includes all entries for the data including an extensive description of the object, dimensions, materials, cultural heritage attributions and holding location as well as paradata which concerns the imaging equipment and rendering software.