New Classicists Conference - "Collaboration and/or New Techniques in the Classics"

Cosa Excavations:
New Techniques in Research and Outreach

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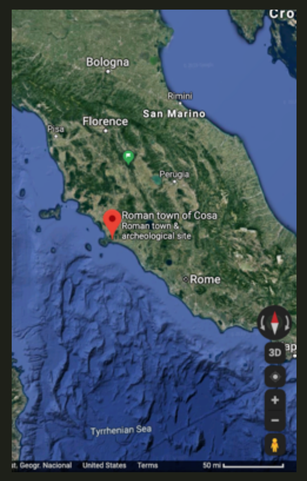
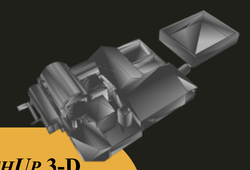


Introduction

Since 2013, the Cosa Excavations team has explored a bath complex in the central Italian colony of Cosa (Ansedonia, Italy). The colony of Cosa was established in 273 BCE, but the bath complex was not built until much later in the town's history. Its location near the forum and use of a large, communal reservoir are indicative of its public nature. Built over the course of centuries, with many phases evident in the archaeology, this bath is quite interesting. It is clear from brick stamps found in the heated sector of the structure that this zone was constructed in the late second to early third centuries CE. The southern half of the building, however, was constructed in a stone and mortar technique (*opus vittatum*) and was probably built much earlier. Hypotheses about the original structure's purpose range from a public building with shops, to a private *domus*, to an early bath from the late Republican or early Imperial period. As our excavations continue, we attempt to bring to light new evidence to support our analysis of the phasing of this bath.

PHOTOGRAMMETRY MODEL OF NORTHERN AREA OF BATH (2016)



SKETCHUP 3-D RECONSTRUCTION BY MICHELLE WANG (PRINCETON)

ORTHOGRAPHIC COMPOSITE IMAGE OF TRENCHES (2013-2019)

Digital Recording: Artifacts and Architecture

New approaches have been undertaken to reproduce the artifacts and architecture found at the site both digitally and tangibly. Our digital recording work is a collaborative effort with a team from Indiana University, led by Matthew Brennan, who have aided in the application of new recording techniques to our more traditional archaeological efforts. Drone photography, composite recreations, open access 3D models of artifacts and trenches, pXRF analysis of finds, and VR projects with interactive measuring capabilities are a few of the experimental and practical applications that we have implemented during the seven years of excavation at the site of Cosa.

Photogrammetry has been used at our site for several years. This technique, which uses digital photographs and the programs Agisoft Metashape and RealityCapture to stitch together models, has been instrumental in creating 3D models and prints for further study. A second technique for creating 3D is new to the 2019 season. Purchased with funds received from a grant from Florida State University, a handheld scanner (Artec Space Spider) is used to scan objects, creating models similar to those produced via photogrammetry. The scanner, however, creates more accurate models more quickly than other techniques, which means we can produce more models of our finds. We hope to use this device more in the upcoming season to record our finds more quickly and accurately.

Scan these QR codes to see more material from Cosa!

Central Sounding (2015) Model By: Matthew Brennan (Indiana University)
Cosa Faun Model By: Matthew Brennan (Indiana University)
Laconicum 4 (2017) Model By: Allison Smith (Florida State Univ.)
ETW Interior (2019) Model By: Emily French (Univ. of Pennsylvania)
Façade Sounding 8 (2019) Model By: Emily French (Univ. of Pennsylvania)
Cosa Virtual Site Tour Model By: Matthew Brennan (Indiana University)
Cosa: Reservoir, Cistern, Bath Complex Model By: Matthew Brennan (Indiana University)

Research, Education, and Outreach

While the primary use of the 3D models and scans is research-based, the benefits of producing these models are many. The photogrammetric models of the trenches are particularly useful in illustrating the contexts of architecture and architectonic elements that remain *in situ* and are currently backfilled. This allows for a more thorough understanding of the site, particularly for volunteers and researchers who were not present during the excavation of a trench. Composite images of these models are also useful in illustrating architectural relationships, as seen in the image above.

The educational and outreach benefits of these models allow for the presentation of architecture and materials outside of the field. Using multiple trench models produced over the season of excavation, we have been able to illustrate theories of stratigraphy and excavation methodologies in the classroom. Recently, 3D prints of artifacts (a herm head, two inscriptions, and an antefix) were part of an exhibition for the general public. By handling these to-scale replicas, visitors were able to comprehend their use more fully.

MARBLE INSCRIPTION (C13. 185)

3-D SCAN OF MARBLE INSCRIPTION (C13.185) USING ARTEC SPACE SPIDER

3-D SCAN OF HEAD OF DIONYSUS USING ARTEC SPACE SPIDER

HEAD OF DIONYSUS HERM (C19.185)

EXAMPLE OF PHOTOGRAPHS USED IN PHOTOGRAMMETRY MODEL OF HEAD OF DIONYSUS

3D MODELS PRODUCED VIA PHOTOGRAMMETRIC TECHNIQUES