Traveling back in time through smart archaeology

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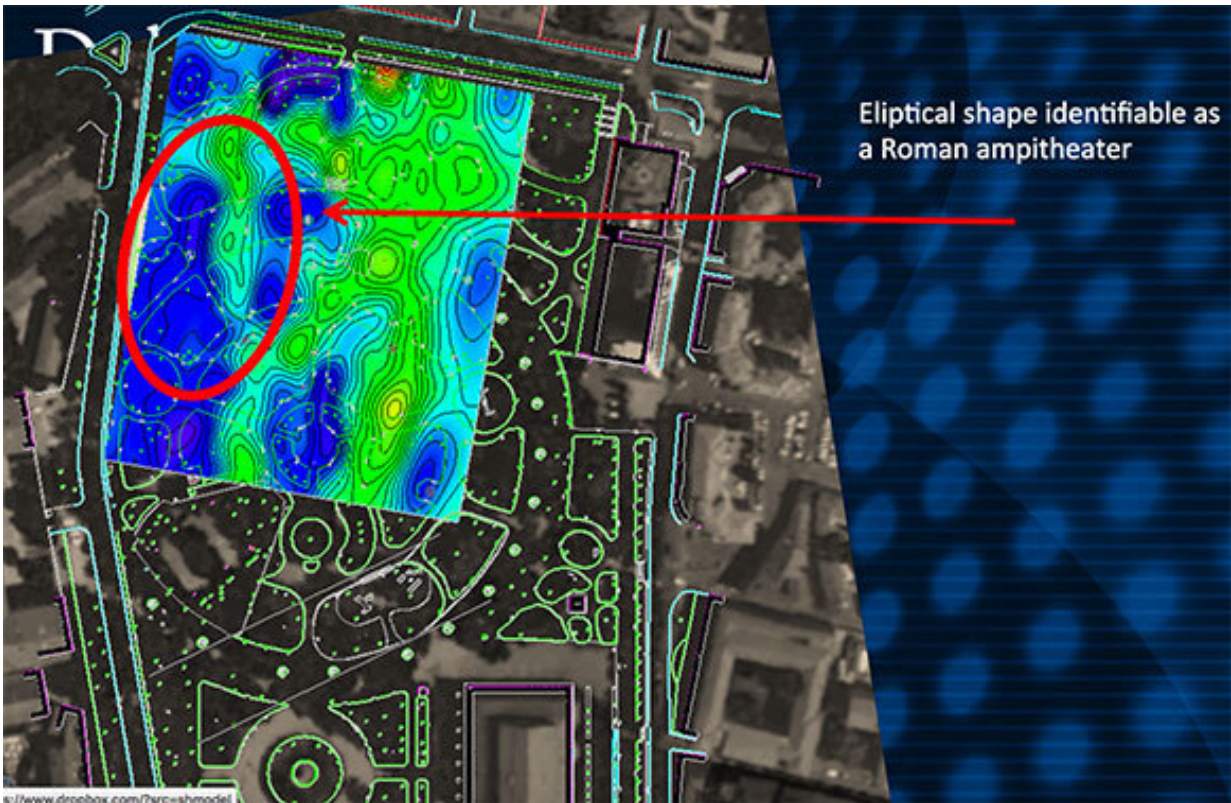

Credit: Duke Research Blog

The British explorer George Dennis once wrote, "Vulci is a city whose very name … was scarcely remembered, but which now, for the enormous treasures of antiquity it has yielded, is exalted above every other city of the ancient world." He's correct in assuming that most

people do not know where or what Vulci is, but for explorers and historians—including Duke's Bass Connections team Smart Archaeology—Vulci is a site of enormous potential.

Vulci, Italy, was an ancient Etruscan city, the remains of which are situated about an hour outside of Rome. The Etruscan civilization originated in the area roughly around Tuscany, western Umbria, northern Lazio, and in the north of Po Valley, the current Emilia-Romagna region, south-eastern Lombarty, southern Veneto, and some areas of Campania. The Etruscan culture is thought to have emerged in Italy around 900 BC and endured through the Roman-Etruscan Wars and coming to an end with the establishment of the Roman Empire.

As a dig site, Vulci is extremely valuable for the information it can give us about the Etruscan and Roman civilizations—especially since the ruins found at Vulci date back beyond the 8th century B.C.E. On November 20th, Professor Maurizio Forte, of the Art, Art History and Visual Studies departments at Duke as well as Duke's Dig@Lab, led a talk and interactive session. He summarized the Smart Archaeology teams' experience this past summer in Italy as well as allowing audience members to learn about and try the various technologies used by the team. With Duke being the first university with a permit of excavation for Vulci in the last 60 years, the Bass Connections team set out to explore the region, with their primary concerns being [data collection](#), data interpretation, and the use of virtual technology.

An example of one of the maps created by the team. Credit: Duke Research Blog

The team, lead by Professor Maurizio Forte, Professor Michael Zavlanos, David Zalinsky, and Todd Barrett, sought to be as diverse as possible. With 32 participants ranging from undergraduate and graduate students to professionals, as well as Italian faculty and student members, the team flew into Italy at the beginning of the summer with a research model focused on an educational approach of practice and experimentation for everyone involved. With a naturally interdisciplinary focus ranging from classical studies to mechanical engineering, the team was divided, with people focusing on excavation in Vulci, remote sensing, haptics, virtual reality, robotics, and digital media.

So what did the team accomplish? Well, technology was a huge driving force in most of the data collected. For example, with the use of drones, photos taken from an aerial view were patched together to create bigger layout pictures of the area that would have been the city of Vulci. The computer graphics created by the drone pictures were also used to create a video and aided in the process of creating a virtual reality simulation of Vulci. VR can be an important documentation tool, especially in a field as ever-changing as archaeology. And as Professor Forte remarked, it's possible for anyone to see exactly what the researchers saw over the summer—and "if you're afraid of the darkness of a cistern, you can go through virtual reality instead."

In addition, the team used sensor technology to get around the labor and time it would take to dissect the entire site—which by the team's estimate would take 300 years! Sensors in the soil, in particular, can sense the remnants of buildings and archaeological features up to five meters below ground, allowing researchers to imagine what monuments and buildings might have looked like.

The team at work in Vulci. Credit: Duke Research Blog

One of the biggest takeaways from the data the team collected based on discovering remnants of infrastructure and layout of the city was of the Etruscan mastery of water, developing techniques that the Romans also used. More work was also done on classification of Etruscan pottery, tools, and materials based on earlier work done by previous researchers. Discovering decorative and religious artifacts was also impactful for the team, because as Professor Forte emphasized, these objects are the "primary documentation of history."

But the discoveries won't stop there. The Smart Archaeology team is launching their 2019-2020 Bass Connections project on a second phase of their research—specifically focusing on identifying new archaeological sites, analyzing the landscape's transformation and testing new methods of data capturing, simulation and visualization. With two more years of work on site, the team is hopeful that research will be able to explain in even greater depth how the people of Vulci lived, which will certainly help to shine a light on the significance of the Etruscan civilization in global history.

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