

Calit2 Researchers to Model Ancient Maya City in Google SketchUp

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Archaeologists at the University of California, San Diego, are using a free download from Google to create detailed, three-dimensional visualizations of the famed ruins of Chichén Itzá, bringing the field one step closer to truly "virtual archaeology."

Along with archaeology professors Thomas E. Levy and Geoffrey E. Braswell of the UC San Diego Department of Anthropology, graduate student Beniamino Volta (who, with Levy, is an affiliate of UC San Diego's California Institute for Telecommunications and Information Technology, or Calit2) is exploring the use of Google SketchUp to develop a method for modeling the Maya archaeological site. Chichén Itzá was one of the most powerful centers in the Maya region of northern Yucatán, Mexico, during the Terminal Classic period (AD 800-1050/1100).

Over the next four years, Volta, working with his mentor Braswell, will conduct field research at Chichén Itzá, collecting survey and excavation data and entering it into a GIS (Geographic Information Systems) database, which they will then integrate with SketchUp models of archaeological buildings and landscapes. The end result will be a web-based interactive research environment, or "virtual city."

Notes Volta: "In addition to its ease of use, powerful features and low cost, another main benefit of Google SketchUp is that it allows you to easily export your models to Google Earth, where they can be visualized interactively in their exact location on the globe. This aspect is particularly important for public outreach and education, as it allows users to experience the models in a platform (either web-based or as a free download from Google) that most are already familiar with."

Here's how it works: During their survey, the archaeologists will use total stations (the electronic/optical instruments used in modern surveying) and global positioning systems (GPS) to measure and record the shape and location of ruined buildings and other architectural features (walls, causeways, cisterns, wells, etc.), as well as the general topography of the site. They will then use the resultant architectural plans and their field observations to approximate reconstructions of the buildings in Google SketchUp.

For more complex architecture, such as that of the Great Ballcourt of Chichén Itzá, photos from multiple angles can be used to fill in the details that are not included in structure plans and profiles. The next step is to combine the models of each structure with terrain elevation and other information gathered during survey to create a "virtual city."

"The CISA3 Virtual Maya Cities project will allow for a virtual visit, in addition to providing a more comprehensive picture of the ancient city," says Volta. "Different models can be created to reflect the growth of the city throughout time or changes in its layout, and by linking the site database with these models, we can use Google Earth's text 'balloons' to explain our fieldwork, post updates or convey other types of content."

Volta says the research team chose Chichén Itzá for the Calit2 project because he's already been studying the settlement patterns and urban layout of a large unexplored area outside the monumental core of the city for his dissertation. That project, which is led by Dr. Rafael Cobos of the Universidad Autónoma de Yucatán and also

sponsored by the National Institute of Anthropology and History INAH, is an international collaboration between Mexican researchers, Professor Braswell and graduate students at UCSD.

Explains Volta: "Since I am overseeing the survey component of the project, I found it useful to begin by digitizing in SketchUp the architectural features in the known portion of the city so as to better visualize the site. We are now adding the structures and features we have surveyed this summer to the model, and will continue to do so as research progresses over the next few years."

Providing the public with virtual access to Chichén Itzá can also assist in the preservation of the site, Volta says. The INAH of Mexico has recently restricted access to most of the buildings at the heavily touristed site due to concerns about the preservation of architecture and the safety of visitors. By allowing visitors to virtually "enter" buildings or entire sections of the site that are currently not accessible to the public, Volta says the project can also serve an important educational purpose.

"As a case in point, the area I am currently working on for my dissertation is a few kilometers outside of the portion of the site that is open to the public. Although about a thousand years ago it was part of a vibrant urban landscape, it is now covered in thick vegetation and very hard to reach. Areas such as this will probably never be open to visitors, who only get to experience the 'downtown' area of the city."

The CISA3 Virtual Maya Cities project was detailed in the September edition of Antiquity Journal's online Project Gallery. Levy, an expert on the southern Levant region of the Eastern Mediterranean, says the project will have broad implications for both his own archaeological research and research within the field at large.

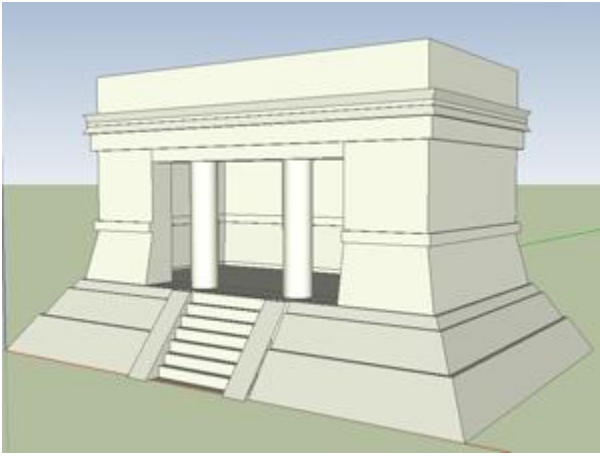
"With the advent of high speed portable computing and digital surveying instruments such as GPS and Robotic Total Stations, it is becoming increasingly easy to collect 3D data from archaeological excavations and surveys," Levy remarks. "This wealth of contextual data is allowing archaeologists to explore the utility of 3D modeling of their data in ways that were impossible a decade ago.

"Since 2002," he continues, "we have accumulated a wealth of site survey data at the site of Khirbat en-Nahas (or "Ruins of Copper" in Arabic) in southern Jordan. These include the plans of buildings and other archaeological sites in the region. We will put some of our undergraduate students to work using Google SketchUp to create 3D models of these sites to help bring to life the ancient Iron Age (ca. 1200-900 BCE) communities that lived in this region."

Since the Google SketchUp model is completed, Volta says the researchers plan to use other Calit2/CISA3 technologies, such as the interactive, fully immersive 3D StarCAVE, to allow for a more enhanced sensory experience of the ancient city.

"At CISA3," adds Levy, "we are exploring a wide range of scientific visualization tools to that are evolving on a monthly basis here in California and other parts of the world. This is an exciting time to be an archaeologist."

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**Great Ballcourt,
Chichen Itza**

This text can be used to
convey useful information
about the structure