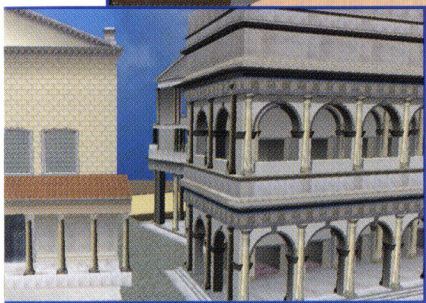




By Dan Gordon '85

ROME reborn



In 1996, experts from the classics, architecture, archaeology and computer science began the ambitious task of re-creating Ancient Rome – byte by byte. The Rome Reborn project was launched by UCLA's Cultural Virtual Reality (CVR) Lab, which combines three-dimensional computer-graphics programs with meticulous research, including input from international teams of scholars, to create interactive models of historic sites from around the world.

Directed by Classics Professor **Bernard Frischer**, the CVR lab combines technology used in video games with U.S. military flight-simulation software. Rome Reborn remains a work in progress, but many individual structures have been completed. Students can pan, walk or fly through the Colosseum. **At Rome's Basilica of Santa Maria Maggiore, visitors can soar between the wooden beams of the cathedral's roof and down below the main floors into the ruins of the church on which Santa Maria was built.** Other projects take visitors to Beaumaris Castle in Wales, the Armenian Church of the Redeemer in the 11th-century capital city of Ani and the Second Temple of Jerusalem. Many of the projects also illustrate how the buildings aged over centuries.

The usefulness of such an approach to history struck Frischer 25 years ago while visiting a museum in Rome, where he saw a huge, intricate plaster of Paris model of the city at the height of its development. Struck by the model's ability to bring to life the words and two-dimensional architectural plans and drawings he had been using to teach students, Frischer began to consider ways to capture the experience for students who couldn't get to the museum. Emergence of virtual-reality technology in the 1990s enabled him to do that and more. "With digital technology there is total flexibility," he says. "You can have dynamic moving views of the model – you can move down the streets and inside the buildings. You can link the building or site to an endless amount of textual and graphical information that can help people understand it. And you can change it as our understanding of history changes."



LONG-LASTING MEMORY

An organic nonvolatile memory device, cheaper and faster than those currently in use, has been created at the Henry Samueli School of Engineering and Applied Science. Lead researcher **Yang Yang**, professor of materials science and engineering, says devices with organic nonvolatile memory (meaning the memory doesn't disappear when the machine is turned off) have "tremendous potential" for applications in personal computers, personal digital assistants and digital cameras because of their lighter weight and speedier response times. They are up to 3 million times faster than conventional nonvolatile memory and can be manufactured less expensively. Nonvolatile memory is currently used in digital cameras, enabling users to remove the chip and plug it into a personal computer, but is not used in PCs because of the prohibitive cost.

The triple-layer device produced by Yang's lab is composed of an embedded metal layer between two organic films. This package is coupled to two electrodes. A positive voltage is applied to turn on

the device. The transition from the off state to the on state is equivalent to the "writing" process; the device remains in the on state even when the power is turned off. The organic memory device operates on the principle of electrical bistability, a phenomenon in which an object exhibits two states of conductivity at the same applied voltage.

Yang says the new device could even be used to perform the signal-switching task that drives modern computers. "This could never compete with silicon, which is so much faster," he says. "But we could target low-end products that don't require very high speed," such as personal digital assistants.

Conventional nonvolatile memory uses expensive materials and fabrication processes, Yang notes, which is why the organic nonvolatile memory device created by his lab could be a huge cost-saver. "The Styrofoam cup that holds your coffee could potentially power your computer," he says. "That was unimaginable before."

