

> Our work at Southampton bridges the gap between computing and archaeology in bringing the best that colleagues in engineering, electronics and computer science have to offer to unique artefacts from our past

Digital images reveal secrets of Roman painting

CUTTING-edge imaging techniques are being used in the digital restoration of a 2000-year old Roman statue.

The delicately painted statue, which was discovered in the ancient ruins of Herculaneum in 2006 and believed to depict an Amazon Warrior, is now the subject of a joint restoration project by the University of Southampton, the University of Warwick, and the Herculaneum Conservation Project.

Highly sophisticated digital imaging is vital for the recording, subsequent analysis and restoration of cultural heritage material. Experts in archaeological computing led by Dr Graeme Earl of the Archaeological Computing Research Group in the School of Humanities, University of Southampton UK, have used a novel form of photography Polynomial Texture Mapping (PTM), developed by HP Labs - to provide a detailed record of the texture and colour of the painted surfaces.

A specially-designed rig, camera structure, and associated custom software was developed in the School of Electronics and Computer Science by Dr Kirk Martinez and the team in the Mechanical Workshop to enable very fast acquisition of PTM data, with variable sample sizes. The rig uses a lightweight tripod running on battery power, making it adaptable enough to use on archaeological sites. The whole kit is highly portable and can be carried in a suitcase.

"It was fascinating to pull together various elements from my imaging research projects in order to solve all the issues for the new rig design," said Kirk Martinez.

The head of the Amazon Warrior was discovered in 2006 in the ancient ruins of Herculaneum, a town close to Pompeii, which was buried in the AD79 eruption of Mount Vesuvius. The delicate painting of the statue's features and its fine state of preservation meant that it was regarded as a landmark discovery by archaeologists, providing clues to the decoration of Roman statues that had previously been only guessed at.

The digital restoration project is an initiative of the Packard Humanities Institute, in collaboration with the Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei and the British School at Rome.

"Our work at Southampton bridges the gap between computing and archaeology in bringing the best that colleagues in engineering, electronics and computer science have to offer to unique artefacts from our past," said Dr Earl.

The series of images resulting from the scanning process is used to produce a single PTM file via the HP Labs PTM fitter software. The PTM viewer enables a virtual light source to be moved across the virtual scene. The viewer can also vary lighting intensity, add additional virtual lights, derive surface models and to carry out image processing tasks such as edge detection.

Source: Southampton University Website