

# Art conservation

1 Pompeii, with views to the nearby volcano, Vesuvius



2 A wall mosaic found in Herculaneum



3 Wall paintings found in Pompeii



4 Short-wavelength, high-energy UV-C radiation



5 Carbonised scroll found in Herculaneum, dating from before 79 CE



6 The Diamond Light Source in Oxfordshire, England



7 3D laser scanner



In 79 CE the eruption of Vesuvius buried the towns of Herculaneum and Pompeii (1) under many metres of ash and other volcanic debris. Both towns were effectively frozen in time and many features preserved until Pompeii was rediscovered in the sixteenth century and Herculaneum in the early eighteenth century (see CHEMISTRY REVIEW Vol. 33. No. 1, pp. 26–27).

Processes for conserving and interpreting the ancient artworks (2, 3, main image) in Herculaneum and Pompeii have emerged, first by trial and error and later from scientific research. Nowadays, when visitors go home in the evening, high-energy ultraviolet radiation provides a chemical-free way to destroy biological growth on wall paintings (4).

In 1752 the charred remains of around 1800 scrolls were discovered in Herculaneum (5) — the only known intact library from antiquity. Experts have attempted to unroll around half of the scrolls through various methods over the years, and many have been destroyed in the process.

The Diamond Light Source (6) is a particle accelerator in Oxfordshire that accelerates electrons close to the speed of

light, such that they give off super-intense beams of light. In July 2017 the Diamond Light Source was used to read a single letter 'c' on the inside of a still-rolled-up Herculaneum scroll. Machine learning is now being used in an attempt to decipher passages from complete scans made of two scrolls. In 2023 the original team was able to use machine learning to detect ink from these scans and the Vesuvius Challenge was launched, offering \$700 000 to the first team to read four separate passages.

3D-laser scanners (7) are now a tried and tested technology. They can be used to create 3D scans of buildings to a high degree of accuracy and detail. A number of 3D scans can be spliced together using software to generate highly interactive 3D models. These can be used to monitor, prioritise and plan conservation work across interdisciplinary teams, or to generate 3D experiences for visitors or 'online tourists', such as this one, which explores in accurate detail the house of Caecilius Lucundus in Pompeii:

<https://tinyurl.com/Pompeii-3D>

