

# CASE STUDY

## X-MET8000 Expert in archaeometry, conservation and restoration – Ashmolean Museum

© Ashmolean Museum, University of Oxford



### The Ashmolean Museum, Oxford, UK

Founded in 1683, at a time when the idea of the 'museum' was brand new, Britain's first public museum, the Ashmolean, was initially the home of a collection of miscellaneous manmade and natural specimens and curiosities from every corner of the world, which was presented to the University by the wealthy antiquarian and polymath, Elias Ashmole. The original building included a fully equipped laboratory and was designed to promote the teaching of 'Natural Philosophy'. This was the philosophical study of nature and the physical universe, the precursor of what are known today as the natural sciences, so the Ashmolean was, effectively, the University of Oxford's earliest specialist facility for the teaching of science.

The neoclassical architecture of the present museum dates back to 1845. Built to house the University's collections of paintings and sculptures, these were joined in the 1890s by the

archaeological collections which had far outgrown the capacity of the original building to hold them. The museum was re-named the 'Ashmolean Museum of Art and Archaeology' in 1908 and it has since grown to become one of the most important museums of art and archaeology in the world.

The Ashmolean began its life embedded in the University's teaching and research structure but, from the beginning, had a commitment to public access and education. 332 years on, these commitments remain at the heart of its work, form the basis of all its activities, and drive forward its rich and varied public engagement and academic programmes (see [www.ashmolean.org/](http://www.ashmolean.org/))



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# CASE STUDY

## X-MET8000 for the non-destructive elemental analysis of artefacts and works of art

When acquiring new items, collections or studying existing ones, the museum's conservation departments use a variety of techniques to analyse and characterise artefacts or objects, such as handheld X-ray fluorescence (HHXRF). HHXRF has many benefits in archaeometry, conservation and restoration applications:

- Non invasive
- Non destructive
- Portable
- Fast

Dr Kelly Domoney, Objects Conservator at the Ashmolean Museum, University of Oxford, and Research Fellow at Cranfield University, UK, uses Oxford Instruments' **X-MET8000 Expert** on a regular basis in the investigation and characterisation of materials in the Ashmolean's collection. The **X-MET** for example helps answer curatorial and conservation questions on manufacturing materials and techniques, provenance and dating, identification of restoration materials, authentication studies, and characterisation of corrosion processes.

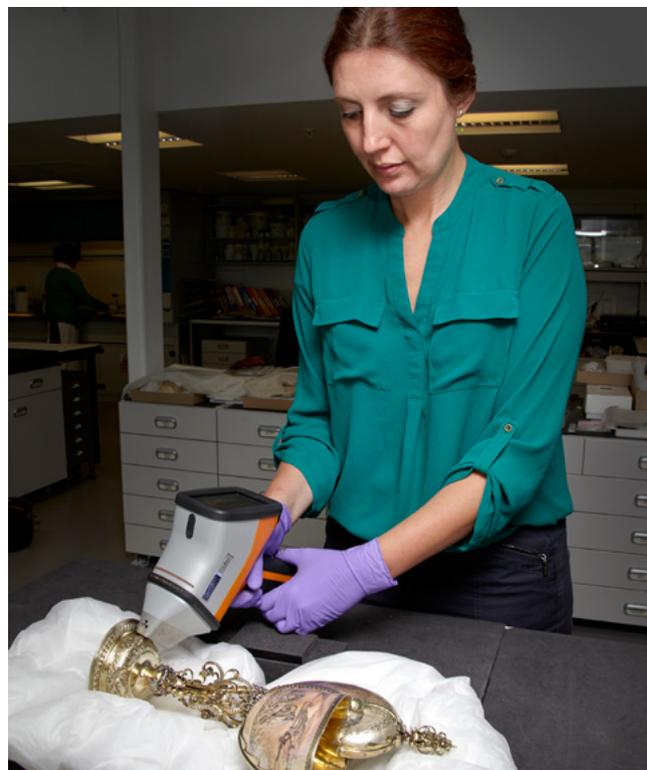
Examples of the work carried out with the **X-MET** are:

### **Analysis of Renaissance Dutch Silver in the Wellby Collection:**

This project aims to identify the purity of silver used in the manufacture of pieces in the collection and to identify restored sections. Initial results show that restored areas are easily identified by the presence of chromium, iron and lead. The results are being used to prepare the catalogue entries for an exhibition.

### **Analysis of Worcester porcelain:**

The instrument is being used in the characterisation of the coloured glazes on Worcester porcelain to help answer questions on authenticity. Many 18th century Worcester pieces were known to have been redecorated in the 19th century. Identification of 19th century pigments such as chromium green and high zinc yellows can help curators to date the pieces more accurately. The results are being used to inform the entries on a new collection's catalogue.



*Dr Domoney testing a mounted nautilus shell (origin 1620-30, Germany).  
© Ashmolean Museum, University of Oxford*

### **Analysis of Meissen porcelain:**

Porcelain was first produced in Europe at the Meissen factory in 1710. The Ashmolean has one of the very early pieces from the factory, a large tea or coffee pot dating to 1719-1722. The lid and spout are of a different colour and form and appear to have been replaced. A comparison with the **X-MET** database of Meissen glazes developed by Kelly Domoney at Cranfield University indicated that the spout is composed of a similar material to the main body of the teapot and was replaced sometime between 1719 and 1725, whereas the lid is made from a completely different glaze material and is a much later replacement.

## X-MET8000 features and benefits for analysis work at the Ashmolean Museum

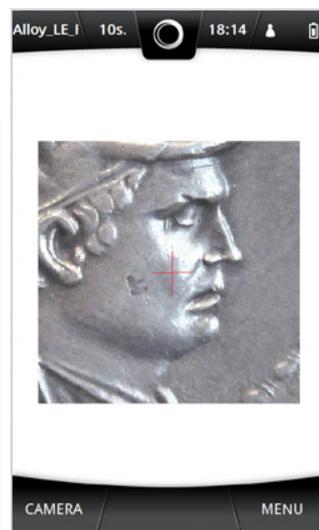
The X-MET8000 is a valued tool in the conservation department of the Museum, as it presents many advantages:

- Compact and lightweight for ease of use
- Clever range of accessories, such as the compact carrying case which contains all useful accessories for full portability (including the light stand for the analysis of small items such as coins)
- Integrated camera to pin-point and image the analysis area
- Variety of analysis programs for the analysis of a wide range of materials
- Bevelled snout for the testing of irregular-shaped artefacts

*X-MET used with its light stand and safety shield for the analysis of small objects, such as this Indo-Greek silver coin (reign of Demetrios I, 200-180 BC).*  
© Ashmolean Museum, University of Oxford



*Camera image of the coin on the X-MET screen, for accurate positioning*



## Conclusion

Dr Domoney says:

“The portability and non-destructivity of the technique is essential to the analysis work at the museum. Many objects are immovable and the insurance costs involved in taking objects to a laboratory are often prohibitive. The ability to conduct analyses in-house means that a broader range of research projects can now be performed. In the past, the characterisation of materials and identification of corrosion products were often done by eye. The X-MET enables us to assess collections in a far more in-depth way, meaning that we can accurately document and compare materials in the collections, and identify further research needs.”

Our thanks go to Dr Kelly Domoney, Daniel Bone, Mark Norman and David Gowers at the Ashmolean museum, University of Oxford, UK, for their help with this case study.

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