ExpoTime!

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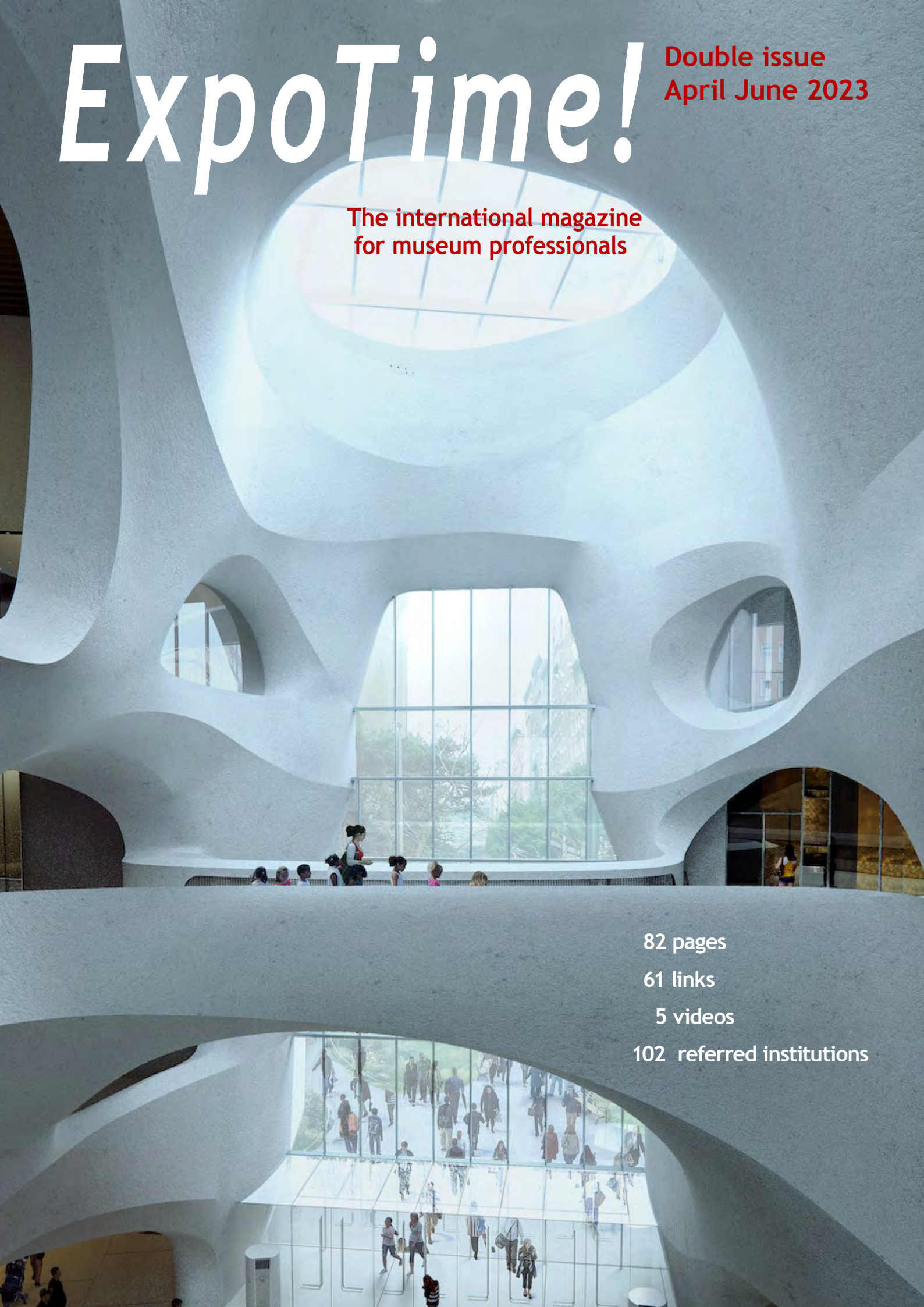
for museum professionals



82 pages

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Lifting up by its bootstraps: After the deletion of the "Sackler" name, secret negotiations with Athens, the British Museum ends the British Petrol sponsorship

After 27 years, the British Museum is stopping its financial support from British Petrol. The last funding agreement from 2016 has now expired. After several other major British museums, such as The Tate (2016), National Portrait Gallery (2022), Royal Shakespeare Company, Scottish Ballet and the Royal Opera House had waived funding, the "Hieroglyphs" exhibition was the last special exhibition to be funded by BP.

For 27 years, BP has supported numerous special exhibitions as title sponsor, most recently the successful "Troy: myth and reality" in 2019/20, "I am Ashurbanipal: king of the world, king of Assyria" in 2018/19 and "Scythians: warriors of ancient Siberia" in 2017. Previously they have supported "Sunken cities: Egypt's lost worlds", "Indigenous Australia: enduring civilisation", "Ming: 50 years that changed China" and "Vikings: life and legend". In addition, BP has supported special public events at the British Museum such as Chinese New Year (2008), the Mexican Day of the Dead (2009), and most recently the Days of the Dead Festival (2015), supported by BP and in association with the Government of Mexico as part of the 2015: Year of Mexico in the UK. There is also support for the BP Lecture Theater.

However, it remains unclear whether BP is only withdrawing from exhibition funding; it currently seems possible that structural funding for the museum's revitalization measures (the masterplan (see p. 24) comprises £1 billion / $1.24 billion) will remain.

Following the oil spill of the "Deepwater Horizon" in 2010, the premises of the British Museum and the Great Hall had been the scene of artful protests by various climate activist groups demanding the end of BP's sponsorship. It is interesting that the British Museum has always allowed such protests in the museum as long as there is no danger to the collection, the staff or the visitors.

In early 2022, more than 300 archaeologists and historians wrote to the museum's trustees calling on them to cut ties with the company, while activists presented fake "Stonehenge drilling plans" to visitors. In 2020, the museum was occupied for three days during its BP-sponsored "Troy" exhibition.

Additionally, demands to withdraw from BP funding also came from other parts of society: "Archaeologists, teachers, heritage professionals and climate scientists – as well as its own staff members – have been calling on the British Museum's director and trustees to rethink their relationship with BP for years" stresses Rodney Harrison, professor of heritage studies at UCL Institute of Archaeology, who himself was one of the signatories to a submission to the museum ("Culture Unstained"), which was submitted by Sir Robert Watson, the former chair of the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, and by Naomi Oreskes, a professor of the history of science at Harvard University. Other signatories included Willow Coningham, from the UK Student Climate Network; Mark Serwotka, the general secretary of the Public and Commercial Services Union, representing many British Museum staff; Paul Ekins, professor of resources and environmental policy at UCL and the former co-director of the UK Energy Research Centre. Actors also got involved, such as Emma Thompson, Mark Ruffalo and Mark Rylance.

Last December, the Chair of the museum, George Osborne, announced that the museum no longer wanted to be a place for climate protests: "Our goal is to be a net zero carbon museum," said Osborne, "no longer a destination for climate protest but instead an example of climate solution". Even before that, it had become strangely quiet about the promotion of BP, which recently drew attention to itself with unusual high profits. From April to June 2022, the energy giant raked in adjusted earnings of $8.5 billion. More than triple compared to 2021.

But how big was BP's financial commitment really? In the end, it was just a piece of cake for BP, because the sum, which sounded enormous at first, was distributed among several institutions as a big deal. It is said to be less than 1 percent of the British Museum's budget.

Enjoy the issue!

Christian Mueller-Straten, PhD
Publisher of EXPOTIME!

Title picture: Just opened: The Richard Gilder Center for Science, Education, and Innovation of the American Museum of Natural History, New York. Rendering by MIR and Studio Gang. For more details, see our next issue! Photo: Museum

Regine Krüger; William (Bill) Wei

Protection against counterfeiting and looting by roughness data measurement

Again and again, criminal gangs succeed in spectacular break-ins in museums. The stolen exhibits are worth millions on the black market. At the same time, the demand for art and cultural assets is increasing on the international stage and does not stop at looted art and stolen goods. Looted art from collections or from areas affected by the civil war has often been found in renowned museums. They had obviously not looked so closely when purchasing the exhibits. Thousands of missing objects are already documented in the Art Loss Register, in the Red List of the International Council of Museums (ICOM) or at Interpol. But the authorities are making no progress in combating the illegal trade in cultural goods, especially since import controls vary from country to country. In order to make it more difficult for thieves to find their way around, shops electronically protect their articles and goods against theft. This is hardly possible on the art market: Old oil paintings, antique amphorae or sculptures from different eras are under special protection, but cannot be easily equipped with electronic security systems. William (Bill) Wei, retired Senior Conservation Scientist, says therfore: "The looting of unprotected archaeological sites and the illegal trade in cultural assets are a huge problem." He worked for many years at the Rijksdienst voor het Cultureel Erfgoed, the Dutch cultural heritage agency.

In order to reliably identify the origin of works of art and to protect them from theft, the art world has long been demanding so-called "object passports". An important part of this could become a digital fingerprint (DF) that documents the micro-roughness at a specific point on an object. They are intended to offer buyers reliable proof of origin and thus protect against the acquisition of counterfeited or stolen objects. This would also be of inestimable help for the national customs.

The EU project "FING-ART-PRINT"

But how can works be permanently protected against theft and counterfeiting? And how can a museum be sure

The MarSurf CM mobile by Mahr, Germany. Product photograph: Mahr GmbH, Goettingen, Germany

that originals lent to special exhibitions are actually being returned - and not well-crafted forgeries? As part of the EU project "FING-ART-PRINT" from 2005 to 2008, a promising solution to this problem was developed, which has now been confirmed once again by long-term studies: Like every work of art, its surface structure is unique at the micrometer level.

As part of the FING ART PRINT project, Wei's team examined the surface structures of more than 30 objects provided by ten museums and two private galleries. The researchers scanned them using 3D measurement technology and used them to create a kind of fingerprint. And it is actually just as unique as the human. According to Wei, such a fingerprint is recorded on an arbitrary, secret area of the object.

The procedure

The basis for the measurements is the confocal technology that measurement technology specialist Mahr developed at its Oberhausen site. In general, the confocal technique makes use of the fact that different heights/depths of a surface can be observed by moving the microscope lens up and down. The confocal microscope scans all levels and combines them into a topographical map in a matter of seconds. "A spatial resolution of less than one micrometer and a deep resolution of less than 0.2 micrometers are now possible, which is more than sufficient for a fingerprint that cannot be forged," explains the researcher. The roughness data are available as ASCII files, the topographic maps as JPEG files and are therefore compatible with any archiving system. Customs officials could use FING-ART-PRINT to "fingerprint" items against international databases.

From the automotive industry to art

Although roughness data measurement has already been used by conservators to check the integrity of cleaning methods [1], the identification of art objects by their surface roughness was unknown until the start of the EU research project. But Bill Wei has a different background than most of his colleagues: He studied mechanical engineering with a focus on materials science. As an engineer, he was initially responsible for aircraft engines and later worked in the automotive sector. Roughness measurements, for example on engine crankshafts, are part of day-to-day business here: "Back then, I dealt a lot with surfaces in order to check the components in terms of friction, wear and tear and lubrication and to increase their durability." In this respect, Wei had long been in contact with Nanofocus, a Mahr subsidiary specializing in 3D measurement technology. When it came to protecting cultural assets from counterfeiting, he brought this know-how into play and was able to convince his colleagues and sponsors to support the research project.

The test setups

For FING-ART-PRINT, the fingerprints were initially recorded with a tabletop device from the MarSurf CM series. A 10x lens was used, which offered a distance of 10 mm to the object. The lens of the 3D device has a field of view of approximately 1.6 × 1.6 µm. A spatial resolution of 3-4 µm and a depth resolution of 1 µm was chosen for the measurement. Capturing a fingerprint of this size and resolution takes less than 30 seconds.

"The advantage of the table model is its stability. However, the fixed geometry of the setup limits the size and shape of the objects and the selected location for "fingerprints", i.e. scans, because they have to be positioned under the narrow objective lens. This also makes it more difficult for criminals to spot the selected area." (Wei).

Which materials and techniques are suited for the DF?

As further investigations have shown, unique, high-resolution fingerprints can be obtained from a large number of objects. According to Wei, these include metals, plastics and printed paper, but also the coloured surfaces of paintings, wood and ceramics. These fingerprints can even be used to distinguish metal objects cast from the same mold and pages from two copies of the same book. "So far, only textiles without metal decorations, unprinted paper or mechanically unstable objects such as heavily corroded metal objects have been found unsuitable for fingerprints. This is because textile or paper fabrics move easily due to climate changes and mechanical movements of the object. However, the general orientation of the fabrics and, more importantly, the surface roughness of the individual yarns and/or fibers remain the same.

In a second setup for mobile use, the device, which was developed as the MarSurf CM mobile, was mounted on a robot arm and moved flexibly to the objects. Advantage: The DF can be taken at almost any point; a webcam documents its exact position. The MarWin evaluation software uses an image matching algorithm with the help of these webcam images to identify the spot used for the fingerprints.

Long-term tests confirm the durability of the DF

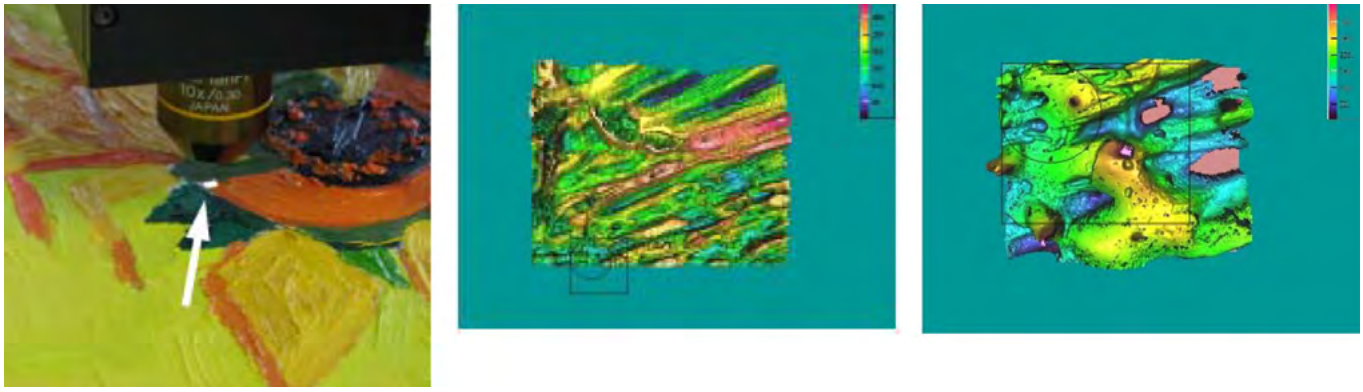
In order to ensure that the fingerprints remain stable and valid in the long run, further studies have been carried

out on their durability. Renewed test series after fifteen years have currently shown that the roughness has not changed significantly over the period. An exception is the roughness of fresh paints that have not yet fully dried. Of course, surface cleaning, conservational impacts or accidental damage to objects also affect the measurement results.

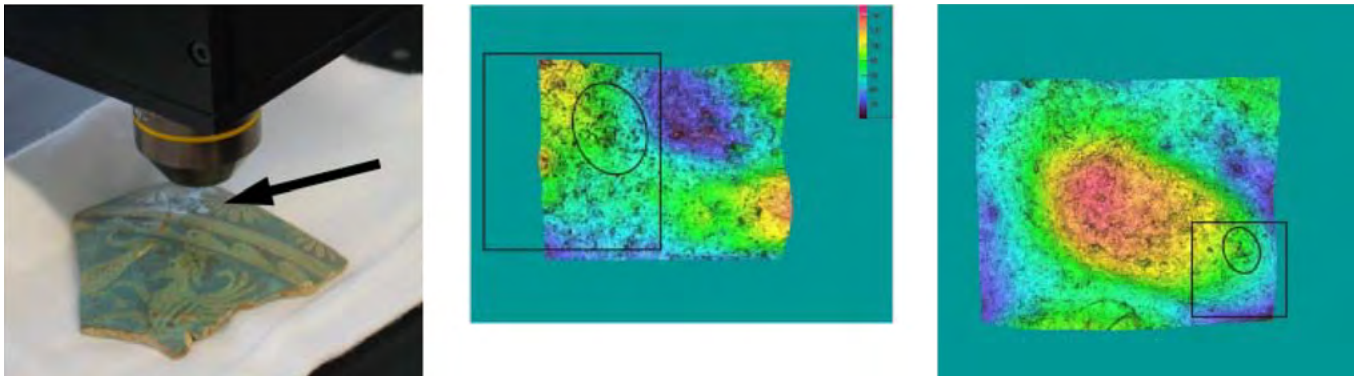
The results of the FING-ART-PRINT project thus show that fingerprinting is a promising way to identify objects and protect them from theft and illegal trade. Since 2019, Bill Wei has had his own MarSurf CM mobile in his former office. He himself has since retired, but is still actively researching. Fingerprints can thus be used as part of an object passport, one of the cornerstones of combating illicit trade in cultural heritage objects. After the successful long-term trials, Bill Wei is now looking for partners to market this system internationally.

Three examples of roughness DF

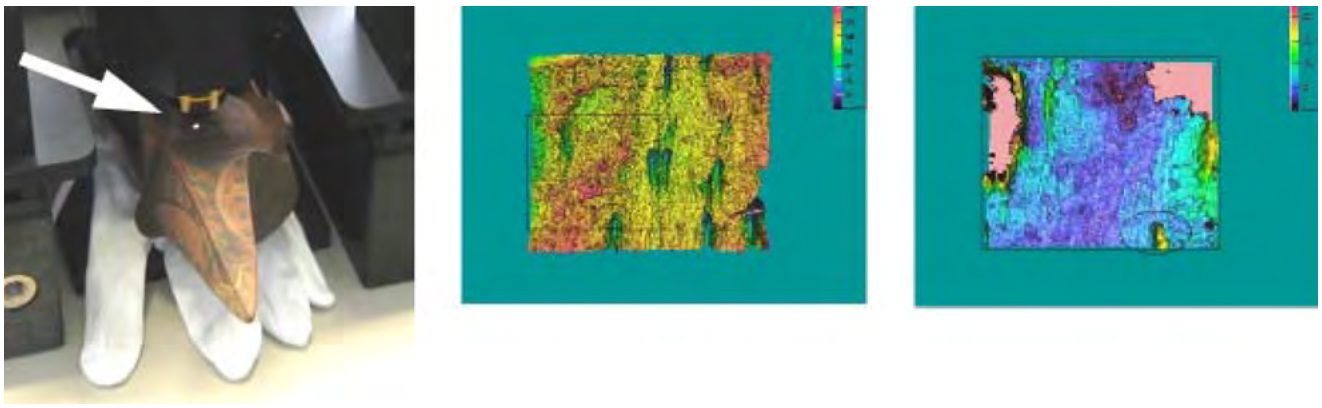
Each picture consists of three parts,
a) the position of the fingerprint on the object and
b) photographic false colour maps and
c) fingerprints of the position recorded by the table model and the FING ARTPRINT robotic system respectively. In all DFs, the lighter areas (red/yellow) are higher than the darker ones (green/blue).



Fingerprints of the roughness of a test panel using a Van Gogh's painting on linen (Object courtesy of the Van Gogh Museum, Amsterdam; photos: Bill Wei, ICN):
a) Position of the DF, represented by the point of light.
b) Topographic false colour map (8 × 8 mm): the height of the scale is 350 µm, with red and yellow colours expressing higher strata and blue resp. green ones expressing deeper strata (peaks and valleys). The match with c) is indicated by the square and the circle.
c) Topographic map recorded by the FING-ART-PRINT robot. A match with fig. 1b is indicated by the square and the circle. Although this map is only 1.6 × 1.6mm, a comparison of the areas marked by the squares and circles in fig. b and c shows that the second fingerprint coincides with a spot on the lower left of the first fingerprint. The three large defects within the circle are clear reference points for the two fingerprints.



DF of roughness from a fragment of an Egyptian faience vessel (object courtesy Allard Pierson Museum, Amsterdam; photos: Bill Wei, ICN):
a) The position of the DF is indicated by the point of light.
b) Topographical map of the point in a). Height scale 250 µm. A possible match with c) is indicated by the square and the oval. The illustration shows a DF measuring 4.3 × 4.3 mm from the fragment. The fingerprint appears relatively smooth, but has a significant amount of fine structure, which derives probably from microscopic bubbles in the glaze.
c) Topographic map recorded by the robot FING-ART-PRINT (1.6 × 1.6 mm). Possible match with b) is indicated by the square and the oval. The DF shows the same macroscopic smoothness with considerable fine structure. A comparison of the areas marked by square and oval in b) and c) suggests a possible match. It appears that the fine (bubble) structure in the oval in Fig. c) is the same as in b). The relative position to several other surface details suggests that it may be a good DF match. However, the loss of some details due to vibrations in the second fingerprint makes a definite identification difficult.



DF of the roughness of a wooden ancestor figure from Nias, Indonesia (object courtesy of National Museum of Ethnology, Leiden; photos: Bill Wei, ICN):
a) Position of the fingerprint represented by the point of light.
b) Topographic map (2.95 × 2.95 mm). Height scale 150 µm. Possible match with c) is indicated by the square and the oval. The roughness fingerprint is 3 × 3 mm in size and shows a fine vertically oriented texture covered by a speckled structure. The height difference between the darkest and the brightest area is about 150 µm. Several deep vertical grooves can also be seen. The fine texture is most likely the grain of the wood, while the coarser texture and deep grooves could be the result of the carving process.
c) Topographic map recorded by the FING-ART-PRINT robot (1.6 × 1.6 mm). Possible agreement with b) indicated by the square and oval. The roughness fingerprint shows slight loss of resolution due to the robot's vibrations. This makes it difficult to determine if it is a match to the previous fingerprint shown in Fig. b). The top of the groove (oval) provides a possible reference point, and there are certain structures that appear to be similar and are in the "right" place.

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