

Continuing the theme of how digital technologies are transforming archaeology, Adi Keinan-Schoonbaert introduces an experiment in crowdsourcing and crowdfunding

MicroPasts – an innovative place for progressing research

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Archaeology has always attracted enthusiastic volunteers, who have participated in excavations, surveys, site recording or artefact handling, as well as museum-related tasks such as engaging with visitors or helping with curatorial duties. However, most data have been produced by specialists. More often than not the knowledge remains in academic or professional domains. Poorly known evidence and objects fill museum storage rooms and university archives. Traditional methods and resources do not seem sufficient to give these assets the public attention they deserve.

A new space is needed, where archaeologists, historians and heritage specialists can join volunteer archaeological societies and other interested members of the public, to create high quality data that is of interest to all, in a more open and participatory form. To this end, researchers, archaeologists and curators from the Institute of Archaeology at University College London (UCL) and the British Museum have created MicroPasts. Funded by the UK Arts & Humanities Research Council, MicroPasts is a web-based environment, built wholly upon open-licensed and publicly available software. It allows the public to engage in different ways with real academic and museum-related tasks.

Participants can contribute in many different ways. People can complete different types of research tasks on the “crowdsourcing” platform, and help with the kinds of large-scale data collection that are very difficult to achieve using traditional research methods (see crowdsourced.micropasts.org). They can also make small “crowdfunding” donations to support new collaborative projects between community groups and academic institutions (see crowdfunded.micropasts.org).

And finally, as well as supporting other people’s research projects, online participants can discuss whether they might want to develop their own collaborative proposals for crowdfunding.

With the usual lack of funds in the cultural heritage sector, some jobs are never likely to get done by paid staff. But with the goodwill of volunteers, platforms such as MicroPasts can advance research while supporting public enthusiasm for museum collections and archaeology. In return, contributors receive credit for their input, learn new skills, or

simply enjoy spending time doing something meaningful. So what types of tasks can you contribute to?

Take a record

MicroPasts' main crowdsourcing applications focus on British bronze age metal finds (c 2500–800bc). These outstanding prehistoric objects offer relatively accurate dating evidence, and are crucial for reconstructing bronze age social, economic, technological, political and ritual life. Tasks include document transcription, geolocation of findspots, and masking object photos for 3d modelling.

The first crowdsourcing task combines transcription and geolocation. While a substantial part of bronze age metalwork found in England and Wales since 2003 has been recorded by the Portable Antiquities Scheme (pas), large numbers of finds were made before this. Around 30,000 painstakingly compiled and illustrated index cards, known as the National Bronze Implements Index, record metalwork discovered in the 19th and 20th centuries. This archive was first developed in 1914. It moved to the British Museum in 1966, where it is housed to this day. The cards include information such as the objects' type (spearhead, axe, sword etc), findspot, measurements, condition and sometimes details of the discovery context, with – often beautiful – drawings.

MicroPasts users are asked to transcribe this information and, where possible, georeference discovery locations by dragging and dropping a marker on an OpenLayers dynamic map. Such digitisation tasks are better done by people than machines, as the variable handwriting and placement of written text on cards can prove too challenging for computer-led transcription. When combined with the pas database, this digitised catalogue will become one of the world's most comprehensive georeferenced datasets of archaeological metal finds.

The second application is aimed at the construction of 3d models, where crowdsourcing can help with an important step in the process – the masking of digital photographs. The technique is called structure from motion (SfM): 3d shapes are estimated via calculations based on the perceived motion of a camera around its subject. Software assesses areas of overlap between digital images of a desired object or landscape feature taken from different angles. Importantly, and unlike other 3d methods such as laser scanning, users do not need to be specialists to apply such SfM methods (see features Sep/Oct 2014/138). These require only a set of digital photos taken with a consumer camera in ordinary lighting conditions, while following simple guidelines relating to camera use and required number of overlapping shots.

Before being processed into a 3d model via software such as the open source VisualSfM or the commercial software PhotoScan, it is often very useful (especially for archaeological artefact models) for photos to be “masked”. The crowdsourcing task of photo-masking presents MicroPasts contributors with photos of objects, and asks them to draw polygons, carefully defining their outlines. Marking where an object ends and the background begins substantially reduces the amount of model cleanup after all masked photos are loaded to the 3d software. The resulting models have an immense value not only for re-use in multimedia applications, but for research as well. For example, 3d technology can help explore issues of similarity and difference between objects of the same type such as bronze age axes, which in turn produce finer-scale dating, for example, or more sophisticated distinctions about artefact manufacturers.

Another MicroPasts crowdsourcing application adds textual information to university and museum photographic archives. This will enhance search possibilities. For example, the Horsfield archive, in UCL's Special Collections facility, includes travel and excavation photos from the 1920s and 30s, taken in Middle Eastern countries such as Jordan, Palestine, Israel and Syria. Volunteers are helping to annotate and tag these photos with keywords, transcribe labels and georeference the subjects to a map.

Funding research

MicroPasts plans to offer further types of crowdsourcing tasks in future. For example, one planned application would have an image upload interface, where people could provide their own photos of registered archaeological sites and monuments or objects in their possession, for these to be photo-masked and then 3d-modelled.

The second major part of the MicroPasts platform is dedicated to crowdfunding – the collection of small donations from keen individuals to help launch research projects. Similar to the crowdsourcing idea, this area of MicroPasts also aims to help archaeology, history and cultural heritage. All crowdfunding appeals available on MicroPasts reflect joint initiatives between traditional academic institutions, volunteer societies and other community organisations.

Unlike the well-established DigVentures, which uses crowdfunding for new excavations (two so far, at Flag Fen and Leiston Abbey in East Anglia), MicroPasts prioritises data collection and processing, such as digitisation of documents or excavation and survey data, finds analysis, scientific sampling or laboratory work. In order to set up a crowdfunding bid on MicroPasts, academic and community partners are asked to provide a short summary of their project, a catchy short video and a

breakdown of the requested budget. Once the bid is up and running, interested donors can contribute using the PayPal payment service. If the set target is not met, the money will be returned to the contributors, or provided for use on other projects of their choice.

A successful bid is expected to give its contributors something in return for their investment. As a default, all projects must guarantee free access (under a Creative Commons license) to all data generated using the crowdfunded contributions. They should also commit to the digital archiving of such open datasets via services such as the UK Archaeological Data Service (ads) or an institutional repository. Other incentives are up to each project, and may include public show-and-tell days, copies of research reports, blogposts with project updates, or museum tours. A few starter projects, now available on the platform, are briefly described below.

One crowdfunding bid available on the MicroPasts platform is that of the Thames Discovery Programme. This is an appeal for £3,000–5,000 to support the study of sites along the river Thames foreshore where river taxis (known as wherries) used to pick up and drop off passengers from the late 16th century onwards. In a collaboration between UCL and Museum of London Archaeology, the proposed survey includes the mapping of landing places, which may comprise river stairs or jetties, with causeways laid out over the foreshore. Funds were also requested for setting up a transcription application on MicroPasts' crowdsourcing site, which will enable the digitisation of relevant documentary material. This will enhance our understanding of this old mode of public transport in the world's river cities.

Another fascinating crowdfunding appeal relates to the study of a medieval abbey at Great Missenden, a picturesque village in the Chiltern Hills, Buckinghamshire. Founded in ad1133, the abbey was a religious centre until the dissolution of England's monasteries by Henry viii in the 16th century. A collaborative project between the Chess Valley Archaeological Society (CVAS) and UCL aims to study written records and archaeological finds uncovered during excavations in the 1980s, to learn more about life and death during the 400 years of the abbey's existence. The crowdfunding bid asks for funds to help CVAS reach this target by digitising records and plans and processing the finds, which include pottery, glass, stone, coins and metal objects, as well as animal bones and human remains. It will also contribute towards the reconstruction of the layout of some of the abbey buildings using photos and diagrams.

A third bid running on the MicroPasts platform investigates the origins of Anglo-Saxon Wessex, the major early medieval kingdom of the West

Saxons. This project will be a collaboration between the Wiltshire Archaeological & Natural History Society, UCL and the University of Nottingham. The aim is to map the original administrative boundaries of Wessex and locate assembly sites, where citizens met for law courts and other political and social occasions. This work will uncover the physical ways in which historic counties and their associated districts (termed “hundreds”) were developed and governed, having wider implications for the governance of the rest of England. A successful bid will finance the compilation and digitisation of surveyed Anglo-Saxon meeting-places, the transcription of relevant documentary material, and the publication of the database on a publically accessible website.

MicroPasts not only provides an enjoyable opportunity to gain knowledge and really help research through different contributory tasks. It also offers a space for debate and collaboration. Anyone can directly contact both traditional academic researchers and fellow citizen scientists, discuss topics of interest to them and develop ideas for future research, using the project’s online forum. Anyone could also access and freely download all data used or created via MicroPasts’ platforms, as well as learn more about any of the themes covered by the project, by accessing tutorials and blogposts written by current team members.

The two MicroPasts features described above, namely crowdsourcing and crowdfunding, will hopefully encourage further collaborative design of new projects. The platform provides the opportunity for any interested member of the public to develop new research initiatives with academics and other specialists, and if interested, to allocate the right budget for them through crowdfunding bids. The broader remit of MicroPasts is therefore to combine these three distinct domains – crowdsourcing applications, collaborative research design, and crowdfunding bids – in ways that support one another. If you have ever been enthusiastic about British prehistoric metalwork, historical archives, archaeological sites along the Thames, medieval abbeys, Anglo-Saxon modes of governance, or any other archaeological or historical topic, please do get involved!

MicroPasts is a joint collaboration between researchers at the Institute of Archaeology, UCL and the British Museum. This article includes contributions from Andrew Bevan, Daniel Pett, Chiara Bonacchi, Neil Wilkin, Jennifer Wexler and Rachael Sparks.

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