STONEHENGE DECODED
Revealing the mysteries of Britain’s most iconic archaeological monument

Buried treasure
Unearthing coin hoards

The big picture
Creating a digital atlas of hillforts
Earlier this year, I walked up onto the ramparts of Maiden Castle. I marvelled at the vast earthworks and wondered at the human effort that had thrown up these banks. A huge enterprise that must have brought people together from across this landscape. How many generations did it take to create this monument? I imagined parents and grandparents telling their children how they’d been part of this enterprise – making a mark on the landscape that they must have known would last for generations, even if they couldn’t imagine how impressive it would look to us, more than two millennia on. The creation of the hillfort brought people together, and it’s still drawing us today. It’s that very human urge to make a mark – writ large.

Archaeology provides us with a tangible, physical link to the past. Walking in places where we know our ancestors walked, dwelt, fought and forged alliances – we feel closer to the people who inhabited these islands before us. Archaeology also provides a counterpoint to history. The interrogation of archaeological evidence allows us to test interpretations based on historical documents. And as we journey even further back in time, into prehistory, when written records run out, archaeology offers us the only means of understanding past lives. It’s also a source of endless fascination and new surprises. Every year, archaeologists unearth new evidence which fleshes out the picture we had before, or even challenges it. Documenting some of these stories each year on Digging for Britain, I am always entranced by that visceral excitement of discovery, and always intrigued by new finds which prompt us to revisit and revise old ideas.

Many of these investigations are funded by British taxpayers – via the Arts & Humanities Research Council (AHRC) – and this magazine covers some of the most exciting AHRC-funded projects of recent years. There’s a new analysis of the iconic Stonehenge landscape, with insights into how monumental architecture evolved as an overblown reimagining of a simpler house, to evidence of midwinter feasts and connections across the wider countryside. Some projects take us far away – to Alaska, Jordan and South America, while others explore, on the one hand, the impact of digital technology in capturing information across landscapes, and on the other, the crucial role that members of the public can play in helping to amass and interpret large volumes of data. Professor Carenza Lewis urges a new view of archaeological research, not as a niche discipline, always looking back, but as a 21st century science that provides us with astonishing and useful insights into how human populations have interacted with their environments through time.

All of these projects open up archaeological discoveries and research to wider audiences and encourage us to connect with our heritage in new ways. Amongst them – in a project led by archaeologists from Oxford and Edinburgh universities, teaming up with citizen scientists – is a brand new atlas of hillforts. In 1891 Sir Hugh Munro published his atlas of Scottish mountains, spurring on walkers and mountaineers to climb as many as they possibly could, a pursuit which has become known as ‘Munro-bagging’. How many people, I wonder, will join me in using the new atlas of Iron Age monuments to help them ‘bag’ hillforts?
Decoding the stones

Stonehenge is one of the most iconic archaeological monuments in the world attracting more than a million visitors every year. But until recently much about the site – its origins and purpose – remained mysterious. Now the AHRC has funded major fieldwork to post-exavation analysis that has revealed many new secrets about this remarkable site and its fascinating landscape.
The Arts & Humanities Research Council (AHRC) has funded multiple research projects in and around Stonehenge in recent years.

“We started off with the Stonehenge Riverside Project, which was primarily excavation-based and focused not only on Stonehenge itself, but other sites in the surrounding landscape, particularly at Durrington Walls,” says Professor Michael Parker Pearson, UCL Institute of Archaeology.

The project was an attempt to develop a better understanding of the Stonehenge landscape in the Neolithic and Bronze Age, and in particular the relationship between the stones and other surrounding monuments. The aim was to explore the hypothesis that several of the sites in this rich archaeological landscape were somehow related.

“We had the hypothesis that Stonehenge was a place of ancestors, associated with death, which was symbolised in stone,” says Professor Parker Pearson. “While the site of Durrington Walls, just down the road, which featured a timber henge, was associated with life. And we’ve proved that in spades.”

The AHRC also funded the Consuming Prehistory and Feeding Stonehenge projects, which looked at what the remains of food at the sites – such as animal bones – might reveal.

“We now know that Stonehenge was the largest cemetery in the third millennium BC in Britain,” says Professor Parker Pearson. “And we now know that Durrington Walls was the largest settlement at that time as well.”

In addition, the project was also able to prove that Durrington Walls was in use at the same time as Stonehenge, further emphasising the link between the two sites. “What we can say now is that the second phase of Stonehenge – when it broadly took the form that we see it in today – was contemporary with the settlement at Durrington Walls,” says Professor Parker Pearson.

Interestingly, the two sites are connected by the River Avon, which flows north-south between them, with both Stonehenge and Durrington Walls connected to the river by solstice-aligned ceremonial avenues.

“But having carried out our excavations we were able to confirm that both avenues exist thus linking the two sites. Our results – Stonehenge for the dead and Durrington Walls for the living – were particularly exciting because archaeology hypotheses are often falsified as soon as the spade hits the soil. That is when you find out what you thought was going on certainly wasn’t!”

Stonehenge is also the only stone circle that we know was built from stones imported from a long distance away. While the larger stones, known as sarsens, are thought to have come from 20 miles away, Stonehenge’s bluestones came from the Preseli Mountains 180 miles away in South West Wales.

“What we thought was important was the association of stone with the ancestors and wood with the living,” says Professor Parker Pearson. “It was in the ‘meaning’ of stone that Stonehenge’s purpose had to lie – especially as the stones were coming from so far away. A great deal of care and effort had been invested in bringing them all that distance to build this unique stone circle.”

The presence of stones from such a great distance is indicative of another discovery to emerge from the recent work: the sheer scale of Stonehenge’s sphere of influence.

“The site was clearly a massive undertaking, requiring the labour of thousands to move its stones, shape them and erect them...”

Far from being a local monument for local people, it is now clear that Stonehenge was at the centre of a vast hinterland, and part of a network of communication, revealed by shared styles of architecture, pottery and other material culture extending from Orkney in the north of Scotland to the south coast of England.

“We were particularly interested in looking at the place of Stonehenge within the wider context of Britain at the time it was in use,” says Professor Parker Pearson.

“It had previously been thought that the monument was at the centre of some kind of political territory. But now we have a better understanding of the settlement geography from that period, we can see that it is actually situated on a boundary between different archaeological ‘cultures’ to east and west. Part of its purpose may have been to unify these two regions.

“The site was clearly a massive undertaking, requiring the labour of thousands to move its stones, shape them and erect them, a communal effort that further emphasises the site’s role as a unifying focus for wider society.

“Avebury may be the largest stone circle but its stones aren’t shaped; and neither are they put on top of each other,” says Professor Parker Pearson.

“Stonehenge is a truly remarkable place at the heart of a fascinating and remarkably well preserved prehistoric landscape.”
Durrington settlement
© Historic England, drawing by Peter Lorimer

Recreated Neolithic houses based on the remains of those discovered during excavations at Durrington Walls
© English Heritage

An example of prehistoric food
© English Heritage / Andre Pattenden
A place of feasting

Just under two miles from Stonehenge lies the site of Durrington Walls, which in the Neolithic and Bronze Age was a massive timber henge – some 480 metres across – which while linked to its stone neighbour, had a very different purpose.

“It has a totally different character to it,” says Oliver Craig, Professor of Archaeological Science at the University of York and co-investigator of the Feeding Stonehenge project.

While Stonehenge seems to have been closely associated with burial, excavations funded by the AHRC at Durrington Walls have revealed thousands of animal bones and ceramics that together indicate a high level of human activity at the site, which seems to be closely associated with mass consumption of food.

“One seems to have been about feasting and celebration – life – the other focused on the dead,” says Professor Craig.

“Given that fact, we wanted to understand the nature of the feasting at Durrington Walls. How unusual was it? And how did it relate to Stonehenge?”

“…people tend to think of Neolithic prehistoric food as being very basic and functional. But in reality there was much more going on; food was just as socially important then, just as it is now.”

Post-excavation analysis of finds has revealed that the feasting that took place seems to have been seasonal and most of the animal bones came from pigs that seem to have been killed in midwinter. This was not the type of bone assemblage that you would expect in a ‘normal’ village where people were living there all year round carrying out routine daily activities.

The pottery was unusual as well: chemical analysis has revealed that the pots were all full of animal products at a time when we think the daily diet was largely plant based.

“There was lots of pig fat, which indicates food eaten most likely in the winter, and in another area of the site we found the remains of pots that contained a lot of dairy products, which we think indicates activity during the early summer months. Although, the more important of these seems to be in the winter when most of the feasting took place.”

Interestingly, there is a bigger question about the consumption of dairy at the site. According to Professor Craig most of the population at this time probably couldn’t digest dairy and were probably lactose intolerant. But by turning raw milk into milk, yoghurts or cheese, they would have made it much more digestible.

“In the bronze age we know through DNA analysis that a greater proportion of the population became more lactose tolerant,” he says. “We think this is due to a large immigration into Britain from continental Europe and all the way down into south east Asia.

“These people were from pastoral communities that were heavily reliant on cattle and dairy and had already developed lactose tolerance, which they brought with them. It will be interesting to find out how what was going on at Durrington Walls relates to that process.”

In addition, analysis of the animal bones has confirmed the importance of the area around Durrington Walls and Stonehenge as a central place within a huge territory.

“When we look at the animal bones we see that many of the animals that were slaughtered here had been brought from some considerable distance away,” says Professor Craig.

Trace chemical elements in animal bones teeth reveal the geography of the area in which they were raised and it’s clear that many of those eaten at Durrington Walls did not spend their lives on the Wessex chalk.

“Our theory is that they were brought by people who were travelling to participate in events in the Stonehenge landscape,” says Professor Craig. “There was a large catchment area – people seem to have been coming from as far away as Scotland.”

It’s not yet clear how unique Stonehenge was in this regard – people may have travelled great distances to other sites as well – but the research is so far only just beginning and others are replicating elements of what has been done here and applying it to other sites. While to the modern mind Stonehenge is a unique, iconic monument. It was only one of many ‘henges’ present in Britain at the time.

“It would be fascinating, for example, to see if people from Wessex were travelling north to Britain and Ireland’s other great Late Neolithic monuments as well as vice versa,” says Professor Craig.

But there was more to Feeding Stonehenge than finding out about what prehistoric populations ate and what this can tell us about their society and culture. Understanding the role of food in the Neolithic world is also a powerful way of helping to build a link between the modern world and the past. After all, we all eat, and thinking about how ancient people ate is one way of bringing their world closer to ours.

“We want to use the research we have done about food to connect with a wider audience and we have done a lot of outreach to the public and in schools to show how science has a role in archaeology through an AHRC Follow-on Fund for impact and engagement,” says Professor Craig.

“We have had upwards of 20,000 people through the various events and exhibitions that we have organised from popular music festivals to a large weekend ‘feast’ event at Stonehenge itself.

“We want to make people think about the role of food in the past.

“I think people tend to think of Neolithic prehistoric food as being very basic and functional. But in reality there was much more going on; food was just as socially important then, just as it is now, for all sorts of reasons and can tell us so much about how our ancestors lived as a result.”
The remains of a huge settlement was discovered at Durrington Walls. But what can the remains of the houses tell us about Neolithic society?

“The houses found during the excavations at Durrington are very telling of why Stonehenge takes the form it does,” says Joshua Pollard, Professor in Archaeology at the University of Southampton.

“The focus is a large hearth at the centre of a square floor set within a circular wall. What’s really interesting is the way that this architectural template is then replicated in much larger monuments.”

For example, at Durrington, archaeologists found larger, more elaborate versions of these buildings with the same square central hearth, this time marked out by four internal posts.

Elsewhere, around Durrington Walls and Woodhenge, remains of similar timber structures were found, but on a monumental scale. Not just houses, but massive halls or free-standing wooden shrines. One of these, the first phase of a structure known as the Southern Circle, was massively enlarged by adding outer rings of posts. It is this construction that provides the timber ‘blueprint’ for the sarsen and bluestone monument of Stonehenge. The implications are profound.

“…the hearths themselves were sometimes mobile – they could be taken up and moved from old to new buildings – and so it is quite literally a case of home is where the hearth is.”

“You can see within the architectural format of Stonehenge a trail back to more humble dwellings”, says Professor Pollard.

“This perhaps tells us something about the key role of houses as focal points. Stonehenge is an extrapolation of domestic architecture. It’s taken the form of the house and enclosed it in rings of stone which highlight its sacred nature.”

With well-made chalk floors and traces of internal timber furniture, the houses found at Durrington Walls are unique for domestic settings in southern Britain. There are parallels though with similar buildings in Orkney, but in stone.

“At Durrington the level of preservation is really remarkable and we have got a really good idea about how the houses were built and used,” says Professor Pollard.

“For me, the interesting thing about them is how heavily focused everything is on the hearth. And as we know [from the food remains], they were inhabited in deep midwinter, so you can imagine why.

“The hearth was where you can imagine people gathered. Interestingly, we can see from the Orkney examples that the hearths themselves were sometimes mobile – they could be taken up and moved from old to new buildings – and so it is quite literally a case of home is where the hearth is.”

The chronology of the sites in the Stonehenge landscape seems to indicate that there was a huge upscaling in monument building within a generation or so around 2500 BC.

“We used to think that monument construction was constant during the late Neolithic but now we know all the really big monuments were created around the middle of the 3rd millennium BC,” says Professor Pollard. “We can also see a series of regional centres emerging.”

Why did people suddenly feel the need to gather and build these great monuments at this time? “This was a period when Britain was drawn into networks that stretched deep into Europe and we start to see evidence here of new people and cultures – the so-called ‘Beaker People’,” says Professor Pollard. This trickle of migrants arrived about 4,500 years ago and brought with them new customs, new burial practices, and beautiful, distinctive bell-shaped pottery.

“Perhaps the development of Stonehenge at this time represents some millenarian-style thinking?” says Professor Pollard. “Perhaps there was an upscaling of traditional religious practices in response to the presence of new ideologies? It seems feasible. We see a similar upswing of activity around Avebury, for example, and other sites.

“It was in many ways a time of social and ideological experimentation.”
Down in the valley

Could there be more to the Stonehenge landscape? One scholar argues that we can only really understand its place and purpose by looking further afield.

The major sites of Neolithic Wiltshire are on the high ground. But while places like Avebury and Stonehenge have been studied for decades, very little attention has been focused on what was going on down in the river valleys that divide the landscape – until recently.

“My research is in the Vale of Pewsey, which is between Avebury and Stonehenge,” says Dr Jim Leary, University of York. While Avebury and Stonehenge are on upland, chalk areas, the bit in between them is a flat valley with an underlying Greensand geology.

“This is quite important,” says Dr Leary. “The valley is very fertile, but also soft and fragile. This means that throughout history the area has been heavily ploughed and a lot of the above-ground archaeology has been destroyed and is just not as visible as, for example, the archaeology on the uplands, which has historically been a peripheral agricultural area.”

As a result, archaeologists have focused their attention on the uplands – where monuments are more visible – at the expense of the valley floor.

“I think the Vale of Pewsey is the heart of the area and this fact has been skewed by the research focus and overlooked by archaeologists,” says Dr Leary. “The Vale is where the bulk of the people would have lived.”

In 2008 English Heritage (now Historic England) mapped a large section of the Vale of Pewsey using aerial photography. This provided almost continuous data for the area between Stonehenge and Avebury.

With AHRC funding Dr Leary was later able to begin a programme of fieldwork across the Vale of Pewsey.

“We spent three years excavating in the Vale and looking at a variety of sites, particularly Marden Henge, which is a very large site that sits at the head of the River Avon,” he says. “This is also the river that flows past Durrington Walls and links that site with Stonehenge.

“Trench with the building surface revealed

“I see these sites and others as a series of important interlinked monuments along the River Avon, which functions as some kind of pilgrimage route between them.”

Many of the finds at Marden Henge were very similar to those unearthed at Durrington Walls.

“It looks as if there was a settlement there first which underlies the henge,” says Dr Leary. “The settlement seems to have been demolished and a henge built over it, exactly as at Durrington Walls.”

In addition to excavating specific sites, the archaeologists also undertook a major programme of soil coring along the River Avon. This project is an attempt to better understand the history of the Neolithic-era river, where it flowed and how high the water level was.

“The really key thing for me is that these river valleys are an important part of the landscape,” says Dr Leary.

“The site of Silbury Hill sits at the top of the River Kennet and I suspect there were monuments all the way down the Kennet, and that links up with the Thames, which we know was an important river in the Neolithic.

“I think the Vale of Pewsey is the heart of the area and this fact has been skewed by the research focus and overlooked by archaeologists. The Vale is where the bulk of the people would have lived.”

“These monuments recognise the importance of these valleys: Marden Henge, Durrington Walls; these monuments are embellishments of the natural world. And the head of the river valleys seem to be really key points. Marden is at the top of the Avon, and Silbury and Avebury are at the top of the Kennet.”

Post-excavation work is ongoing, but already many of Dr Leary’s finds seem to indicate that the sites down in the Vale of Pewsey also had long distance links with other parts of Britain.

“Some of the flint looks like it has come from as far away as East Anglia, possibly from Grime’s Graves in Norfolk,” he says. “The evidence clearly indicates these sites drew people from a very large area.

“There is some really lovely archaeology down there in the valley, if you look for it.”
In the Iron Age and Roman period people buried thousands of coins in hoards across Britain. Was it an attempt to protect the family silver in times of trouble? The truth may actually be more complex, according to a major AHRC-funded study.

**Buried treasure**

There are few archaeological finds that have the magic of a hoard of coins.

Not only do they hold the promise of new information about our ancestors, they deliver the thrill that can only come from discovering buried treasure.

While thousands of such hoards have been found across Britain, until recently the reasons why coins were stashed away in this fashion have remained mysterious.

The general consensus was that they represented an attempt to keep wealth from falling into the hands of thieves or raiders, a very real risk reflected in the fact that so many hoards were never recovered because, it was believed, the owners were killed or carted off as slaves.

But a major new study has revealed that the truth may be more complex.

“We have known for quite some time that there are a very great number of hoards but there was no real contextual overview,” says Roger Bland, a visiting Professor at the University of Leicester and Senior Fellow of the McDonald Institute for Archaeological Research, University of Cambridge. “So we looked at hoards from across Britain.”

With AHRC funding, Professor Bland and his team from the University of Leicester, together with the British Museum, compiled a complete and up-to-date database of the approximately 3,300 known hoards. This is now online and people can query the data in all sorts of ways that wouldn’t have been possible before.

“Of course, the big question in all of this is – why are there so many hoards?” says Professor Bland. “And because of that, we were interested in the context in which the hoards were found. We hoped that this would give us more information.

“We wanted to know why and how they were placed in the ground, in buildings and why they weren’t recovered.

“The conclusion that we’ve come to is that there are a whole range of reasons. The conventional reason is that they were buried in times of crisis when people wanted to put their valuables in the ground because they were afraid of criminal attack.” However this wasn’t always the case and...
Professor Bland now believes there were a whole range of reasons and a significant number were placed in the ground for ritual purposes.

"We know this through a better understanding of [hoard] positions in the landscape," he says.

"The majority were not placed in 'hidden places'. They were placed in quite conspicuous places instead."

For example, there are a whole range of hoards from the Iron Age from Leicestershire that date from roughly the same period and were found very close to each other. "There's no way that 14 different hoards could have been buried together in roughly the same place over a short period of time for safe keeping. It just doesn't make sense," says Professor Bland.

"There's no way the person who deposited one couldn't have known there were others; so they must have known other people were doing it. My conclusion is that it was a sacred place.

"We have also been able to demonstrate that quite a significant number of hoards were buried near watery places, such as rivers, which we have long-known were at the time regarded as 'special places'.

"There's no way that 14 different hoards could have been buried together in roughly the same place over a short period of time for safe keeping. It just doesn't make sense."

"What we have got out of this project is a much better understanding of what hoards mean; no other country has done this and looked at the context of hoards in this way.

"In addition, coin hoards have usually been studied by experts in numismatics [the study or collection of currency and related objects], rather than archaeologists, and this project has been important in bringing the archaeological perspective into the frame.

"I think the most interesting aspect of it all is in the detail we are now able to provide. Through the study we were able to physically locate where these hoards were found in the landscape. In a few cases, we were also able to do geophysical surveys at the site."

One of the largest hoards found in the UK was the Frome Hoard: a collection of more than 52,500 Roman coins found in a field in Somerset by a metal detectorist. He reported his find without digging it up which meant that archaeologists could excavate it and find out more about how it was deposited.

"What we were able to do is look at the context, and once again it was on the side of a hill and not a 'hidden place',' says Professor Bland. "There was a wooded valley below which would have been a better place to hide something, if that was the aim.

"We were also able to do a geophysical survey at the site. Our investigations revealed a previously unknown settlement nearby. All of which go to help us understand where these hoards were located and what that can tell us about why they were deposited.

"Hoard are a very conspicuous phenomenon from the Roman period and there is a great deal of public interest in them – they are buried treasure, after all.

"But they also tell us quite a bit about life in the Roman period and they are our main source of coins for the period. They show us the scale of coin production in the Roman period and reveal something of the religious life of people in Britain at the time.

"There was clearly a lot of borrowing and lending of money. We have a huge number of documents referring to debts being paid or not paid.

"Money was very important in Roman and Iron Age Britain and the way they used that money reveals much about life at that time."
They are iconic elements in our historic landscape: many are lonely hills, looming and visible for miles around. However until recently, surprisingly little was known about the thousands of so-called hillforts that are scattered across the UK and Ireland.

The big picture

For a start, even the name ‘hillfort’ is misleading. Many of these sites aren’t actually on hills and most probably aren’t even forts. It’s now thought unlikely that their primary purpose was military and they were probably some kind of central place where a dispersed rural population could gather at significant moments. But quite when, and what for, remains unknown.

But now a detailed online atlas funded by the AHRC, has for the first time, drawn together the locations and details of the UK and Ireland’s 4,147 hillforts.

The research project was led by Professor Gary Lock, Emeritus Professor of Archaeology at the University of Oxford, and Professor Ian Ralston from the University of Edinburgh.

“The first reason we decided to compile this atlas was because these are popular monuments in the public mind,” says Professor Lock.

“A lot of people visit them, they walk their dogs there, and play with their children on them. They are often located in beautiful places.

“The second reason is that these are monuments that are integral to Iron Age studies. We need to know more about them. The third reason is simply that it is very hard to access information about them at the moment. If you want to look at any scale larger than an individual site then it’s very hard to do so.”

Professor Lock says that while there were some national records, they weren’t in a form that was easy to use, and it was very difficult to get access to comparable information across national borders.

The new atlas is built on a colossal collection of data. Lurking behind the URL is information harvested from pre-existing sources, site surveys and library research – all carefully formatted so that it is coherent and broken down into the same characteristics.

“One of the really great potential uses of the dataset is that it is easily downloaded as a CSV file meaning that you can run it through whatever database you are using, or through Geographic Information Systems (GIS),” says Professor Lock.

“It is the beginning of a whole new era of research and will allow us all to compare work on a local, national and even international scale.”

Professor Lock says that one of the most important lessons he has learned from undertaking a project at this scale is that it’s essential to allow plenty of time.

“It takes a lot longer than you think it will,” he says. “For some of the team, we initially only had funding for three years, but we needed them for longer. It’s easy to underestimate the scope and scale of a project like this.”

There was also a big citizen science element to the project, which Professor Lock describes as “very rewarding”.

“The whole team is very grateful to the AHRC,” he says. “They were fairly hands-off, which is good. But when the project came to an end they picked it up as something of public interest and organised a massive publicity campaign, which was brilliant.

“We were featured across the media and that got the public interested and engaged. The web stats for the first week were really incredible. It was a wonderful feeling to see the public engaging with our work.”

To access the hillforts atlas visit: https://hillforts.arch.ox.ac.uk/.
Castle Law hillfort in Midlothian, one of the thousands of hillforts in the UK

Photo courtesy Kieran Baxter
The AHRC has funded pioneering archaeological research all over the world, from Sudan to Scotland. Here are some of the most fascinating examples told from the Principal Investigators (PI).

## Around the world

### 1. Alaska

Our AHRC funded project has been undertaken in constant consultation with community elders and tradition bearers of the Yup’ik Eskimo descendant community near Quinhagak, Alaska. Excavations at the Nunalleq archaeological site have yielded an extraordinary collection of over 75,000 pieces: full-sized wooden masks, human and animal figurines, hafted tools, leather clothing, grass baskets, bowls, kayak parts, weapons, game pieces and much more, all in nearly pristine condition. It is likely the largest such collection ever recovered from a single site in Alaska and perhaps from arctic North America. Bioarchaeological remains: fur, hair, feathers, seeds and insects have also shed light on climate change in the Yup’ik past that inform community decisions today. In the summer of 2018 the collection was returned to the newly constructed Nunalleq Culture and Archaeology Center in Quinhagak, where a conservation lab has been operational since 2017. A number of spin-off projects have continued to build on this project, most recently a Major Research Grant which will fund publication of the results of this very successful project.

**Dr Rick Knecht**
University of Aberdeen

### 2. Scotland’s Rock Art Project

Prehistoric rock carvings are a unique aspect of Britain’s heritage. Almost 3000 ‘cup and ring’ marked rocks are known in Scotland, and new discoveries are made every year. The carvings, which probably date to c.4000-1800 BC, are arguably our most fascinating and enigmatic prehistoric monument, yet they are neglected and poorly understood.

The Scotland’s Rock Art Project is the first major research programme to focus on prehistoric carvings in Scotland. Our aim is to raise knowledge and awareness of the carvings through community co-production and research. We have ten trained Community Teams gathering detailed information and creating 3D models of rock art across the country. Information co-produced with our teams forms the basis of our research, and is publicly accessible via our dedicated website: [www.rockart.scot](http://www.rockart.scot).

We are fostering wider understanding of the rock art by sharing our research outcomes with professional and public audiences. Increasing knowledge, empowering communities, and enhancing social value have immense potential for inspiring research and creativity, improving sustainability, and promoting the international profile of Scotland’s rock art.

**Tertia Barnett**
University of Edinburgh

### 3. Je Landscapes

The Je Landscapes project revealed how the expansion of South American forests dominated by the iconic monkey puzzle tree (Aracuraria), thought to be a pristine wilderness, were actually spread by the ancient southern proto-Je communities around 1,000 years ago. In a region that was previously considered marginal to cultural developments, our excavations also showed how these groups built sophisticated sacred landscapes characterised by burial mound and enclosure complexes, following principles of social dual organisation, that lived in large, permanent pit house villages while practising a mixed economy combining foraging and agriculture. The results of the project have implications for conservation showing that the very biodiversity that we want to preserve in this critically endangered forest is not just the result of millions of years of natural evolution and climate change, but they have an important human footprint that should be taken into account.

**Professor José Iriarte**
University of Exeter
Glastonbury Abbey

Glastonbury Abbey is internationally renowned as the site of the earliest church in England and the legendary burial place of King Arthur. 36 seasons of archaeological excavation took place between 1904-79, but the results were never published. This impeded academic understanding of the significance of Glastonbury but also limited public interpretation at a heritage site visited by around 100,000 people each year. AHRC funding enabled full analysis of the entire archive of antiquarian excavations in a collaborative project led by Roberta Gilchrist of the University of Reading, and the trustees of Glastonbury Abbey. The project included the full analysis of the archaeological collections by 31 leading specialists, including scientific analysis of glass, metal, pottery and tile, radiocarbon dating and a comprehensive geophysical survey. The aim was to set aside previous assumptions based on the historical and legendary traditions and to provide a rigorous reassessment of the archive of antiquarian excavations.

The research provided new evidence for the scale and significance of the Anglo-Saxon monastery and the later medieval abbey. Among the most important findings are new evidence for occupation dating to the 5th or 6th centuries and the re-dating of the unique glass furnace complex to the late 7th century (previously believed to be 10th century). The research refutes previous claims for a pre-Conquest cloister that was allegedly the earliest in England, and the reputed exhumation site of King Arthur. It also revealed distinctive features associated with the abbey’s legends, notably a sustained ritual focus on the presumed site of the ‘old church’, believed to have been founded by Joseph of Arimathea, and the associated burial ground connected by legend to King Arthur. These combined findings have immediate implications for the public presentation of the site.

Follow-on funding from the AHRC enabled digital reconstructions based on the research findings, together with a new guidebook and educational resources. The research is fully open access.

Professor Roberta Gilchrist
University of Reading

Sudan

The Sustainability and subsistence systems in a changing Sudan project explored how comparisons of present-day and ancient crop choices can inform risk management within agricultural strategies along the middle Nile Valley. Archaeobotanical analyses at the ancient island town of Amara West and ethnoarchaeological research, focused on nearby Ernetta Island, provided insight into cultivation practices and the impact of environmental change. Interviews with Nubian farmers revealed changing agricultural practices since the mid-twentieth century. Several crops that were important until recent decades are more arid tolerant than newer cash crops and have long histories in the regional archaeobotanical record, suggesting their environmental suitability. A community-orientated book Nubia Past and Present, Agriculture Crops and Food was created and distributed as part of AHRC-GCRF Follow-on Funding for an impact and engagement project, which aims to preserve local agricultural histories and ecological knowledge for future generations.

Dr Philippa Ryan
British Museum

Jordan

Wadi Faynan is a remarkable archaeological landscape that has been explored by research teams from Germany, the US and the UK during the last half century. This has made a significant contribution to our understanding of the Levant, with particular regard to the origin of farming, the development of metallurgy and desert-based Roman farming systems. Recent AHRC-funded research has made this work available to the local community and ensured that it is used to support economic development via heritage-related eco-tourism. It supported the development of a local museum by constructing a model of the landscape with archaeological sites located, providing museum displays and a guidebook, as well as a film about the Neolithic archaeology.

Further work has explored the various associations with birds in the region, particularly in the Neolithic: as sources of food, symbols of power, and as inspiration of art and music. This involves the analysis and interpretation of bird bone assemblages from two early Neolithic sites and a review of all evidence relating to people-bird relationships from the Neolithic to the modern era, as contained in archaeological material and historical documents. The projects involve close collaboration between UK-based archaeologists and Jordanian ornithologists, and will help support bird conservation in Jordan by bringing attention to the value of people-bird relationships and the current depletion of avifauna in the region.

Professor Steven Mithen
University of Reading
New ways of seeing

Digital technology is revolutionising the way archaeologists and heritage scientists work by giving them the capacity to operate at an increased level of detail, scale – and with greater efficiency.

While in the popular imagination being an archaeologist is all about the dig, in many ways the real work only begins when they return from the field to make sense of all the bags and boxes of ceramics, soil samples, bones, lithics and other detritus of human civilization.

This has always been a painstaking, labour intensive process. But now digital technology is changing the way sites are recorded and how post-exavation analysis is conducted, giving archaeologists new tools to find out more about the lives of our ancestors.

The AHRC-funded Fragmented Heritage project introduces new technology that dramatically improves the analysis of sites and fragmentary materials seen through a number of case studies.

This includes new ways of refitting artefacts within sites and the wider landscape to identify and connect widely-spread sites and material.

“Across a wide range of applications, the Fragmented Heritage project has been providing new capacity to work at an increased level of detail, scale – and with greater efficiency. And because it is more efficient, we can do more,” says Professor Andrew Wilson, Co-Director of the research group Visualising Heritage, who is leading this work from the School of Archaeological & Forensic Sciences, University of Bradford.

The project aim was to develop multi-scalar applications of digital technologies in support of greater efficiencies in archaeology. "And a lot of that was embodied in what we see with lithics and lithic technology [stone tools],” says Professor Wilson.

The analysis of lithics has potential to become bogged down by the sheer volume of finds. For example, at the Lower Palaeolithic site of Boxgrove in southern England, the finds went through traditional analysis in the 1980s and 1990s. This yielded evidence of animal processing using stone tools – butchery practices by some of the earliest occupants of the British Isles.

“This told us an awful lot about the site and what went on there, but was obviously also very labour intensive”, says Dr Adrian Evans, Co-Investigator and Project Manager.

“When we scanned this assemblage in collaboration with the British Museum and applied both automated and semi-automated digital refitting to the same finds, we were able to find more refits and derive additional meaning from the assemblages than was previously known. And this is something we have found time and time again: by looking back at previously-analysed assemblages using new technology, we see and learn far more than we have historically been able to identify using more traditional methods.”

Similar exciting results have been made possible when the project team collaborated with archaeologists and palaeoenvironmentalists based at the Turkana Basin Institute in northern Kenya.

The project team used an octocopter drone to take high resolution photographs of the landscape and invited the public to help the team interpret these as part of the FossilFinder citizen science component to the project.

“We can provide a more systematic approach to traditional archaeological techniques such as field walking,” says Dr Adrian Evans. In this part of Kenya the terrain is challenging for conventional field walking, with a lot of dry river valleys and scrub vegetation. But the drone enabled us to map the ground.

Capture of high resolution drone imagery (as part of the FossilFinder project) examined by citizen scientists for bone fragments, lithics and other environmental evidence
surface and then, with the aid of citizen scientists, look at scouring this surface for rocks and fragments of bone that were out of place, as key indicators of the ancient environment.

“With the discovery of fragments as small as tiny fish bones and small teeth, we have learnt more about the ancient environment.”

The related Curious Travellers component to the project draws on collaborations with St Andrews, Birmingham, UNNC and Durham universities. It was stimulated by destruction in 2015 by ISIS forces of parts of the ancient city of Palmyra and by the catastrophic earthquake in Kathmandu the same year, but is also seen with the dramatic fire that more recently took hold at Notre-Dame de Paris.

“These terrible events prompted us to look at how, with the help of crowd-sourced imagery and web-scraped imagery, we could repurpose extant photographs to reconstruct lost detail,” says Professor Wilson.

But the project was not simply concerned with visual recording, the team also wanted to ensure that these images coming from disparate sources produced good, accurate measured 3D data as well, to ensure that the value of digital documentation serves as an important pillar of conservation practice.

“We obviously want to move beyond simply having visually interesting 3D models to having something that we can really learn from, something that can provide remote access to places that are hard or unsafe to visit,” says Professor Wilson. “And where heritage is at risk from, or has suffered from human destruction or natural disaster, we can also aid reconstruction work and support sustainable development.”

So, whether working at the macro scale and looking at structures and archaeological landscapes, or at the micro scale and studying the surface of stone tool fragments, digital technology presents a huge suite of new capabilities.

“Given that each heritage site and archaeological assemblage has different requirements, we need to build flexibility into our toolkit, and that’s what Fragmented Heritage has been about: developing capabilities and extending reach,” says Professor Wilson.

“There is no one-size-fits-all approach when it comes to digital heritage, and that’s what we have sought to develop within the team: a wide-ranging toolkit that can be adapted as needed to best serve the conservation, interpretation, presentation and access needs for heritage.

“With this digital legacy comes huge potential for gaining new insight into the past and for impactful new ways of using this knowledge alongside present-day need.”
How can archaeologists make sense of the huge amount of raw data now available to them about our ancestors’ lives? The answer, according to one AHRC funded project, is through the power of citizen science.

Strength in numbers

Archaeology, like a lot of subjects, has been experiencing a surge of new information and data over the last five to ten years.

“It started earlier, in the 1990s, when it became a condition of planning permission that developers fund archaeological research, if necessary, which led to an absolute flood of reports from commercial archaeologists,” says Andrew Bevan, Professor of Spatial and Comparative Archaeology at University College London.

“But more recently, technological advancements, such as databases and more efficient geophysical equipment, have created a whole new tranche of data.”

This huge mass of data clearly has huge relevance for academics; the challenge is how on earth to make sense of it all while faced with limited time and resources.

“While traditionally you might suggest a PhD student or post-doctoral student might research, collect and synthesise evidence on a topic on their own, that is not always viable,” says Professor Bevan.

“However, in the wider academic world, citizen science and public involvement at scale is increasingly being seen as a way of making sense of large datasets, and it’s against this background that the AHRC-funded ‘MicroPasts’ work took place.”

Professor Bevan was sure that there was a place for citizen science in archaeology, particularly as it has such a long history of volunteering.

“We didn’t want to ask members of the public to help with just one project, we wanted to create a platform where researchers from large and small organisations could put up some kind of small project and ask for help with some aspect of data collection,” he says.

The project began in late 2014 with a grant from the AHRC and the remit to explore crowd-sourcing and crowd-funding. The aim was to explore if there was a platform that could help community groups find help with things like transcription or digital model creation.

Each project template was meant to be reusable for similar projects in the future and the platform also needed to be self-sustaining.

“We have now completed some core projects, including a big one to assist the British Museum by transcribing a huge old card catalogue containing a massive 20,000 - 30,000 records detailing all the Bronze Age artefacts found in Britain,” says Professor Bevan.

“By putting these into a database – and not just scanning them – we were able to create something genuinely useful.”

The database, which is a collaboration between University College London, the British Museum, the Fitzwilliam Museum and the University of Stirling in Scotland, complements and extends existing records such as the UK Portable Antiquities Scheme, allowing researchers to map finds. They can also compare types of finds and the scale of finds.

For example, it’s possible to look at gold items versus bronze items and compare high status finds with more utilitarian metalwork.

“We didn’t want to ask members of the public to help with just one project, we wanted to create a platform where researchers from large and small organisations could put up some kind of small project and ask for help with some aspect of data collection.”

“A lot of people have got involved, and they seem to have enjoyed themselves – to the extent that many seem to have been inspired to further involve themselves in local groups or take archaeology courses and degrees,” says Professor Bevan.

Many institutions and community groups have now got involved in various citizen science projects, including the Mary Rose Trust and the Egypt Exploration Society. There’s even a project currently running looking at the links between Iron Age and Roman history and its links to current events, such as Brexit.

In addition, one of the understandings of all of these projects is that, if people are offering their time for free, what they discover should be publicly-available, for free, for all researchers to use.

“We’ve been trialling different ways of doing things – different ways of recording, georeferencing, tracing images...” says Professor Bevan.

“Over the coming year we are hoping to get help with coin recording, which is interesting because traditionally this is a highly specialised task requiring a high level of expertise.

“But we think that there are ways to supplement that specialist effort with enough people looking at the data and cross referencing what they see. It’s early days as an idea, but it might lead to some really good, novel conclusions.”
Dr Adi Keinan-Schoonbaert worked on the crowdsourcing initiative MicroPasts as a postdoctoral researcher.
Excavation of a skeleton from the cemetery of the medieval Hospital of St. John, Cambridge
Photo courtesy the Cambridge Archaeological Unit
The future of archaeological research

Carenza Lewis  
Professor for the Public Understanding of Research, University of Lincoln

Archaeology is well-suited to 21st century research. Its interdisciplinary scope and capacity to advance understanding of the human condition and processes of change over different scales and timespans render its insights increasingly important in a changing globalised world, and it is certainly a subject of high public interest. But archaeological research is also more expensive than most humanities subjects and less self-evidently socially beneficial than many science subjects, so it will need to be able to demonstrate its value.

Heritage research is likely to be particularly important in the future. Recognising the need for responsible research and nurturing the current trend for co-produced, publicly engaged research, archaeologists will surely want to prioritise the exploration of new and better ways of beneficially connecting people with the past, of protecting heritage assets and of protecting society from abusive use of the past.

Future archaeological investigation is likely to be less invasive. Harnessing increasingly sophisticated remote sensing methods to record fractional variations in colour, moisture, temperature and electromagnetism entirely invisible to the human eye, caused by remains ranging from single burials to entire cities now shrouded by vegetation, water or overlying landforms, has potential to revolutionise our understanding of past human use of apparently virgin landscapes.

“Knowing more precisely the order of past events would illuminate long-term patterns of cause and effect, advancing our understanding of human responses to phenomena such as epidemics, urbanism, migration or climate change.”

Likewise, the increasing sophistication of other scientific techniques will help advance knowledge while causing minimal damage to archaeological evidence, especially if exploring existing archives, many of which contain material yet to be analysed or synthesised. Techniques from biology, chemistry and physics such as dental, isotope or DNA analysis could transform our understanding of past identity, disease, contact, exchange, innovation and mobility at scales ranging from individual life-courses to continent-wide change over centuries. Improving understanding of how pathogens such as plague have developed and mutated in the past, might even help arm us for the future.

Refining dating techniques such as luminescence or rehydroxylation may provide increasingly accurate dates for features and artefacts ranging from flood deposits and irrigation systems, to bricks and even single sherds of pottery. Knowing more precisely the order of past events would illuminate long-term patterns of cause and effect, advancing our understanding of human responses to phenomena such as epidemics, urbanism, migration or climate change.

We should hope that future research will encompass previously overlooked areas. Archaeologists have been thinly spread across much of Africa and Asia, and urgently in Polar Regions; climatic warming is destabilising deposits frozen for millennia. Less remote but often equally overlooked, are lands swamped by today’s cities, towns and villages over the last 200 years; and also the lives of people outside a narrow spectrum of gender, class, ethnicity, age and ability.

Digital technology will have a profound impact. Using new approaches, including artificial intelligence, to collect, manage and interrogate ‘big data’ generated by archaeological research to elicit reliable, nuanced understanding, ranging from sub-atomic to planetary, as well as to store information and to share outcomes with wider society, will surely be at the forefront of archaeological research.

Overall, intelligent, connected and interdisciplinary archaeological research should be increasingly able to address fundamental questions, advancing knowledge and understanding of the character and consequence of human life on our planet, from the long-term perspective that only archaeology can offer – to help build resilience for the future.
In numbers:
AHRC archaeology research

Number of projects funded: 205
Total countries involved in projects: 23
Total funding provided: £47.6 million

Most common outcomes reported by type:

- Engagement activities: 1,708
- Publication: 1,154
- Further funding: 247
- Collaboration and partnership: 452
- Secondments: 201

Top 5 research organisations by successful applications:

- University of Reading: 16
- University of York: 14
- University of Oxford: 11
- Durham University: 11
- University of Bradford: 11