Dr Pete Hommel
lecturer in Archaeomaterials

You're listening to Tales from the square with me Dr Pete Hommel and Dr Matthew Ponting in the Elizabeth Slater Labs for Archaeological Science at the Department of Archaeology, Classics and Egyptology.

We've got a number of different labs where we can carry out all kinds of different analyses. We've got labs for paleo diets, where people can investigate the isotopic composition of bones, and undertake projects looking at how people have moved in the past. And to some extent, what their diet was, as well. We've got labs for microscopy, where we can look at all different types of materials. Everything from seeds and plant remains, charcoal, metals, glass ceramics, and we've got instruments, analytical instruments, which can help us even further we've got electron microscopy, we can do scanning electron microscopy, which allows us to really get super high-resolution images of objects, of the surface of objects, without any of that sort of the optical interference you get from light microscopy techniques. We can combine that with elemental analysis, looking at the chemical composition of material. We can carry out more precise analysis of archaeological materials, their complex chemical composition, using atomic emission spectroscopy, and mass spectrometry as well, thanks to new instruments in our labs.

Over the last two years, we've been really fortunate to be supported by the alumni and friends of the University of Liverpool, in the creation of a new centre out at Ness Gardens, EARTH, the Experimental Archaeology Research and Teaching hub, as it's called, which is a space outside where we have dedicated areas for teaching, and for carrying out practical types of experiments, which, you know, we can't really do in even in our labs here. It really serves as a great complement to the type of work that we do here. But it's an opportunity to really extend student experience of new kinds of activities.

So we're really trying to develop our the commercial side of our work as well. Our instruments here are fantastic. And they're set up specifically for archaeological inherited research. And that gives us loads of opportunities to work with the commercial sector with contract archaeology, with museums. And we're really beginning to do that now in a way which we haven't done at scale before.

My research is primarily based in Central Asia, where I look at how communities of mobile peoples have used materials and technologies to shape their landscapes and to develop their lifestyles. I mostly work on hunter gatherers and pastoralists. So that's people who live without farming in the sense of settled agricultural farming, as we would understand it in their lives. And I'm interested in the ways that they have used materials differently, perhaps to agricultural communities. And what that means for us as archaeologists, when we're trying to study societies, which don't look really very much like our own. I work on material from the earliest use of ceramics about 20 to 14,000 BC. And I also work on much later materials, looking at the way in which people have used metals from the end of the Bronze Age and the beginning of the Iron Age. So looking at ways people have changed their landscapes changed the way that they're using, the spaces they live in, and what evidence we can gain about those lifestyles from the materials they made.

So when we're working out in the field, in places like Mongolia, we're finding relatively few objects. It's one of the things which you know, people often assume that mobile societies have these huge graves full of full of gold and all sorts of things. Well, personally, I've never been particularly interested in those things. They have their role, and they have fascinating things can be said about those kinds of materials. But actually, for me, it's the things of everyday life, which really give us a chance to actually say something about people in the past. Not looking at their, you know, beautiful gold jewellery, perhaps, but looking at maybe their ceramics, what they were using their ceramics for how different sectors of society had access to different sorts of foods, for example, how different sectors of society maybe move through the landscape and use the landscape in different ways. And those sorts of questions we can really begin to answer by looking at ordinary things, fragments of ceramics, bone and evidence, the kinds of evidence which you find in relatively large amounts in settlement contexts, but maybe isn't quite so well represented in burials in the same way.

So when we're looking at ancient materials, we're able to say an awful lot about how they how they're made in a sort of process, sort of questions of process, questions of technology, we can we can reconstruct to some degree, the choices that people were making in the past. And that's really important because people can make all kinds of choices. And the choices that they make when they're creating material culture really reflect their whole social environment. And if we understand how people have made things differently in different periods and different areas of the world, we can begin to reconstruct connections between communities as well.

We can also look at the composition of materials to look at how things change, how people have changed the things that they add to their metals, for example. We can look at the way in which they've, they've changed the places they've sourced their materials from looking at raw materials and comparing them to archaeological material, but also trying to understand the way in which people have created sort of connections through trade and exchanged themselves and sort of directly by taking material from the ground, but also by sort of exchanging it with their neighbours as well.

Staff and students can develop their own skills and understanding of materials in a sort of deeper way by actually engaging with the processes involved in making them. Objects like stone tools, going through the process of ancient mythology, these are experiences which most people don't have. And so understanding how the process of making actually works helps staff and students to actually look at and examine the archaeological record. I think it's really important for the students to recognise what skill looks like.

Dr Matthew Ponting
Reader in Archaeological Materials

I'm Matthew Ponting reader in the Department of Archaeology, Classics and Egyptology of the University of Liverpool. The Elizabeth Slater Archaeological Science Laboratories were opened in 2015 in honour of Professor Elizabeth Slater, who was Head of Department and latterly Dean of the Faculty. And she moved down to the University of Liverpool in 1991, and set up the BSC programme in Archaeological Science and continued to be a major moving force in the department until retirement and subsequent death.

The way people are manipulated the natural world around them, and produce the objects that they felt they needed and wanted tells us an awful lot about how people relate to the world around them. There are often many different ways to actually process or produce a material or an artefact type. So different cultures in different societies at different times opted for different pathways, and it's establishing an understanding why a particular culture chose to process material in a certain way, then can give us insights into the way they thought the way they interacted with the world around them.

We've been doing a lot of research in recent years into the composition of ancient Roman silver coins. I've been collaborating with a colleague from Warwick University since 1995, in a series of projects funded by the likes of the Leverhulme Trust, the Arts and Humanities Research Council, and laterly, the European Commission. These projects are basically designed to give us a deeper understanding of what ancient silver coinage was made from. And from that information by understanding what it's made from, we can understand more how it was used, how the administrative authority that commissioned the coinage, how it wanted the coinage to function. And through trace element and isotope analysis, we can even start understanding where the coins were made in terms of identifying chemical fingerprints for specific mints. And through the use of different lead isotope signatures, start talking about the actual mines where the silver bullion was coming from, and, by extension, how it travelled around, in this case, the Roman Empire.

Using negative muons you can actually fire particle into the coin, which elicits a response which can be detected. So you're actually getting a reading from within the core of the coin. This this is sort of new technology. It's not particularly sensitive at the moment, although things are improving with in that way. And it's an alternative to the traditional analytical approach, which is to use a very, very fine drill to drill into the cylindrical edge of the coin and extract some of the heart metal. The issue here being is that our ancestors were very adept at making the appearance the surface of coins always look as if they were made from very pure good quality silver, whereas in reality, the inside of the coin would show them to be made of a quite a quite a debased silver copper alloy.

So in order to understand the composition, in terms of what the people in the past we're doing at the Mint, we have to take a sample from within the coin. This of course, is, is minimally disruptive. And museum curators are much happier if we can use non-destructive methods. But it's very difficult to use non-disruptive methods to get reliable results, hopefully with negative muons, there's a way to actually do this by understanding where we've come from, we better understand why we are in the situation we find ourselves.

We know increasingly that the ancient world curated its material resources much more carefully than we do today. There wasn't that throwaway culture. And if you look at the both the archaeological record and the historic record, one sees repeatedly that recycling was second nature, that often in for example, parts of the world that didn't have its own metal resources, then metal workers referred to the recycling of specific artefact types as the starting point of their craft. There was a large trade in recycled material around the Mediterranean from glass coloured to fragments of bronze statuary. There was there was there was a lot of there was a lot of interest in that side of things, which I think history has glossed over. And I think we need to rediscover that in order to make more of the dwindling resources that we have.