

EAC12 Q&A Session 14

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Okay, welcome everyone to this question and answer session for Session 14 of the online EXARC Conference for 2021. I have all our speakers here for session 14, who are anxious to answer all of your questions that you have for them.

We have a first question here is for Marco: **what is generally the background of your volunteers? Did they already have experience in house building or in archaeology?**

Thank you for the question. So the background of our volunteers..., it varies to be fair. We've got volunteers who are not absolutely from an archaeological background, instead they're members of the community, of the local community. Our museum is located in basically a post-industrial area outside of Newcastle in a little town called Gyrwe. And some of our volunteers, they come from a very, very different backgrounds. It's important to mention that we are one of the 10, we belong to one of the 10 most unprivileged communities in the UK. So we can have various people from very, very different backgrounds, which is something I do really like, cause we then offer the opportunity to get in touch with archaeology, with activities that otherwise they might have not been considered maybe by certain members of the community. But we do also have highly skilled volunteers, highly specialized volunteers possibly ex-visitors. We do have architects. We've got obviously an army of PhD students from Newcastle university. We've got archaeologists who are, for example, at the moment they're not working on the field, so they enjoy to volunteer for us. In terms of experience yet in timber building? No, we do not have... neither me or my volunteers. We do not have any experience yet into building. But we are starting now in April, on the 17th of April, we're starting our first building project. We are rebuilding our grubenhause. So, we will be trained by an experimental archaeologist. from Newhaven Coppice down the South, Marc Cox, who will come deliver a workshop, deliver a training, and hopefully we'll start to acquire some basic skills to then proceed in our experience with timber buildings. All the buildings we've got in our museum that were built in the nineties, basically from the previous management of what was called Bede's World and now it's called Jarrow Hall, our museum, I hope that answered.

Yes, no, definitely. Actually just following on from that. **So you mentioned that the previous ones were built in the nineties. Do you see a big difference in how you would build them now based on how they were done in the nineties, either due to, I don't know, changes in health and safety regulations or other external influences?**

This is a very interesting question. So considering that I'm not a proper expert in paleo-architecture, and this is really, even for me, it's a first experience, working with volunteers, working at this level in this sort of British institution, such as like experimental archaeology open-air museum. So I'm looking at all the policies or the risk assessments literally now, while I'm finalizing this, this new building project. In terms of policies, I think even when they were built in the nineties there was paid a lot of attention to risk assessments and the way they were built. For example, our grubenhause was built with a set of very non-historically appropriate stairs with a handrail to allow everyone to sort of, well, not everyone clearly... to facilitate some of our visitors in the access of the grubenhause, but yeah, the discourses around accessing these buildings are now in place because we are redeveloping the village trying to, you know, make it more accessible and from a shape point of view, from the way they were built back then, I would say that, for example, our big building, the [Thurlings] Hall, it was built following pretty much Peter Reynold's guidelines in terms of sort of simplified interpretation, you

know, basic interpretation without adding too much to the project. I think nowadays it's important that the museum makes some choices on interpretation to add a certain level to these buildings because they are, I think these kind of structures are on a spectrum which goes from pure experimental projects to tools that the museum uses for public engagement and public education so I think a good selection of interpretative choices can be made such as, I don't know, decorating the buildings, which is something that in the nineties was absolutely out of context.

Thank you very much, a good answer. Our next question is for Anita. **When creating the reference collections, how do you account for possible taphonomic processes?** Yes, we do that. At least I do that in my research and I've seen other people at YEAR Centre do the same. Exactly by experimental archaeology, by trying to reproduce the processes that take the material to the type of record where we found it. For example, I work a lot with dental calculus. So if I am looking at the starch granules that I want to identify from food I try to produce a reference collection where the material has been sourced. Like you've seen in the paper, for example, I create a [flour] with the weeds in it and then I experiment, we're cooking, we're roasting so that I can get an idea of how these would look in dental calculus. Most recently, there is also the option now of [...] material into saliva to see how the saliva actually interacts with the starch, for example. There are a number of papers there. So the [task] depends by what context you are dealing with. In dental calculus our taphonomic context is for example the way material becomes incorporated into dental [cartilage] where it's then preserved as a snapshot. So the best way in this case to reproduce taphonomic processes is to study material from the raw material to the way it enters the mouth, the way it interacts into the saliva and then how it may be incorporated into calculus. I hope that this is clear.

Oh yes, very clear. **So out of curiosity, are you then physically chewing the pieces to see the saliva and that influence?**

Yes, it's not just me, many researchers have done that. And in many reference material is to [cook the], yeah, that is possible. I would like to point this out that if you're going to do this type of research and you are not..., for example, I did the research of this kind in Italy, in [the Department of...Science], and we do this also in York at the YEAR Centre. We need an ethic agreement so I don't want the people think that they can just go and use human saliva in normal experiments. I would like to encourage people to consider all the ethic implications. We do that, we have the ethical agreements for these types of studies as well.

Yes, that's an important point. Something that was mentioned in an earlier talk as well, I think. Okay. Thank you Anita, very interesting answer. Our next question is for Anja from Aimée, actually. Amy, do you want to ask it yourself perhaps?

Sure, yeah, it's a fascinating paper. I thought, you know, the whole sort of chaîne opératoire sequence was brilliant and the way you investigate it, you know, it's really interesting all the different actualistic experiments that you carried out. **Just thinking about the sort of the debris that was created when you were making those fish hooks and saying that you do get evidence of this in the archaeological record. I was wondering if you have sites where you see a concentration of sort of fish hook manufacturing activity happening? Does that exist? Are you getting areas which look like they're sort of spatially segregated for this kind of crafting activity? And if you could talk a little bit more about the whole production and the relationship to production and spatial patterning.**

Thank you, Aimée. It's a very, very interesting question and one that we should definitely work more into studying. I think the sites are a bit of a different, variable character but you have quite clear evidence of working spaces in several cases where you have, you know, dwellings have structures where you have evidence of fish hook production going on inside the hut and that fits sort of more into general distributed patterns that you find on many of these Mesolithic sites that you have this

sort of mixed crafting spaces associated with huts. But then on the other hand, many of these sites are also interpreted as [...]. So then you have more you know a mixed in situation often with fish hooks and debris alongside animal bones and other types of debris and often it's..., at a lot of these sites, you have burnt material, what is preserved is burnt. And you can also... these techniques that we have recognizing these specific types of debris that comes out of making the fish hooks, you can even identify that on burnt bones because it's very characteristic. So I also have several examples of sites where we have sort of identified fish hook production just based on those bits of debris actually. And then a third kind of site is the sort of more mixed sites that you find inside rock shelters along the coast of Western Norway, you have several of those. And there you have a more difficult situation because they're excavated many years ago. And it's not always very well documented the context and whether they represent not a working space or more a [...] space. And you have several phases on top of each other and so on. So yeah, it's a little bit mixed.

It's fascinating. I think we might have to get in touch with you. Jess Bates, who's here, is working on this particular question, but in relation to flint tools, looking at crafting areas at Star Carr, I'm sure Jess will have a follow up email for you at some point in time. That's really interesting.

Yes, please, please do, that will be very interesting. I think also the combination of... we haven't been doing use-wear analysis so far. Some of the fish hooks and the debris is not that well preserved and also it has most eroded surfaces and so on, but I think maybe some of the hooks and debris would have potential for that kind of study as well. And of course also to study whether the flint tools that you find alongside the hooks, whether they have been used for this kind of work.

That was going to be my other question actually that's... yes, exactly that. I'd be really curious about the microwear traces on the flint and the integration of those, you know, of the different technologies, the flint [in the ...] and looking at whether or not you've got use-wear evidence for these sort of spatially defined areas of production. That's really fascinating. Thank you.

Okay, perfect. Our next question is for Victoria. **As far as I understand it, you used a new glass pot or melting crucible for every re-melt. Why was this?**

So I didn't actually use it for each re-melt. I used two crucibles in total and they were for the two separate repeats of the experiment and that was to prevent there being any cross-contamination. Cause you can't remove all of the glass from the first five remelting cycles that were one repeat of the experiment, you know, before doing the second one, you'll never get all that glass out. So I needed to have a completely new crucible so those two separate repeats of the same experiment didn't cross-contaminate each other, but I used the same crucible for each of the five remelting cycles within each experiment if that makes sense.

Okay. **And related to the idea of contamination, did you also wash the recycled glass prior to entering it into the crucible in each new melt?** No, but I don't think there was any particular reason to do so. It came straight out of the furnace and was then just broken up and put straight back in so there shouldn't have been any particular contamination that could have come in, that would affect the composition of the glass.

Okay, perfect, thank you very much. Our next question is for Andy and Izzy whoever wants to take this one about the art pieces. **Were there any particular designs that worked better, so to speak, with the flickering light source? And if so, do you think that some engravings might've been more intended for that purpose than others?**

I can kick off and then maybe Andy will jump in. Yeah, so we didn't really look during the experiment into different designs per se, we were more interested in the heating traces, but what's interesting is with the sort of VR modeling that we're doing afterwards, and I'm currently doing that, sort of this

week as well is, from the archaeological examples from Montastruc where you have, sometimes you have these superimposed forms, so that might be several horses in different positions, almost, kind of overlaid on top of each other and it looks quite messy and difficult to pick out when you're looking at the object. But as soon as you sort of expose that to this dynamic light source that you get from a small hearth, you sort of... it seems to have the effect of seeing almost one form and then the other, and this almost sense of movement and animation to the art pieces. But like I said, we're still sort of looking into that and exploring that further, but I think that's a really exciting output of our experimental program. So I don't know if Andy wants to add to that or not?

Sure. I'll just add a little to that just to agree with that point really, but I think the other aspect here as well perhaps, beyond the engraved forms and their particular composition is the relationship to those engraved forms relative to the morphology of the piece of limestone or whatever the raw material might be and in some instances plaquettes can be quite flat and, you know, can still have quite complex compositions on them, but many more pieces of the stone are going to be much more variable in their particular morphology. And I think it's that relationship with light and how that catches creates shadows, [picks up] and highlights, bumps and changes in that morphology, which can give animal forms particularly the dynamism in particular if they've been positioned with sensitivity to those natural features. So it's a theme that we've touched on in our current work, but I think we want to really carry forward as our research continues. I hope that that addresses the question.

Yeah, no, very interesting. It's similar to, I vaguely remember reading about a cave art thing somewhere where they had a similar idea that they would have drawn it in relation to the actual shape of the rock, something like that...

Yeah. So I think that's where some of our other ideas are coming from. So my PhD is in cave art and we're trying to draw these connections. I think I'll just say, watch this space because we're currently writing the paper on this and hopefully that will be out soon without jinxing anything.

What a tease! We have so much to look forward to after this conference. So many people have said, Oh, yes, I'm working on this. It's like, Ooh, they just want to keep us on tenterhooks. Okay, thank you very much to both of you. We have a question for Sue: **Polishing of the original medieval beads would obviously be quite risky, but have the conservators ever immersed them in water to try to more accurately document their original colours?**

Oh, yes. Well, this is the sort of million dollar question, with all the colours of the beads and... well, immersing them in water, I mean, they're pretty wet when they come out of the ground anyway. And the photographs immediately afterwards certainly don't indicate much difference. The trouble is it's the surface that decays and I am so hoping that a nice museum somewhere will let me smash a few beads because all the colour is inside. When you occasionally come across a broken bead, you can see a much better example of the colour within the bead. And so over time I've been going round all the museums I'm looking at so many hundreds, probably, no, several thousands I should think, even more, beads now, is when I get one that's broken, I can usually see the colour. So I'm an artist as well. So I take my water colour paints and I do a precise matching and a little book of any colours I come across. It's a bit like using Pantone, but it's my own personal one for beads and I'm growing it. So yes, it is a problem to know exactly what colour beads are. But I think the number of colours they had is not that huge. And if you look at say mosaic, glass mosaic, which is very similar glass, if you look in the Ravenna mosaics, you can see the brilliant colours as they probably would have looked very similar to what the beads look like.

Okay, thank you. We should do a study and see the pattern of correlation between Sue visiting a museum and the amount of broken glass beads there, just in case. I'm actually very interested about

that. I also studied... I studied amber beads previously and also found it much more interesting to look at broken beads indeed than whole beads, because you could really see the perforation clearer. **Do you also have issues...I had many issues with previous conservation efforts kind of covering the surface. So I mean, I was doing microwear analysis, so that wasn't possible. Is that something that you also experienced when visiting museums? Are there issues of how the beads would have been conserved in the past that affect your current analysis?**

Some of the ones that are on display certainly have that problem, rather overenthusiastic they seem to have been varnished and so you get this false shine on them, which possibly gives you the colour, but then the varnish has probably decayed and gone brown. So in some ways, it's the opposite. I mean, there are tens of thousands, probably hundreds of thousands of beads in museums, in archives. If I went to the British museum to look at the [...] beads and they are so dusty, I remember being an archaeological illustrator when they were first... not long after they had been excavated and we were drawing them then, and they have now just been crumbling away in their bags. It's impossible to conserve everything which is a shame. But yes, as I say, if one finds a broken one, it's a whoop of delight because you can see inside and you can see so much more of how it was made from the inside out as well. I wish that it would be possible in museums to take some of these beads and actually deliberately cut them in half. So we could learn a lot more rather than just keeping them in dusty paper bags.

Yeah, it is a shame... well, thank you very much Sue. On the subject of conserving things and making sure we can keep them for the future, talking about the 3D model. So [Gianluca](#), or also [Rebecca](#) or [Marco](#), whoever wants to answer this: **How do you account for subjectivity in terms of, for example, modern perceptions of music and sound,when doing the soundscape project analysis?**

Rebecca might have an initial answer. I'm sure. Gianluca will have some.

Yes. Thank you very much for the question. It's actually, the whole principle of soundscape research is taking into account subjectivity. So I guess, it's going to affect how the models are going to be perceived, but we're trying to sort of reproduce them taking into account contexts. So we're thinking about how the space would have been used and, you know, the domestic dimension, so context really is an important part of a soundscape reconstruction. So I don't know if Gianluca wants to go further with that.

Thank you, Rebecca and thank you very much for this question. Yes, the problem of subjectivity is a very important problem, it's a big problem, actually. And, when talking about any kind of reconstruction from the visual reconstruction to the reconstruction of sound actually, it is an issue because our perception of sound and of the visual space is deeply influenced by our backgrounds. So there are... recent research is showing that even the most... for us obvious facts about musical perceptions, for example, the perception of the interval or the octave actually, is not given for granted. There are cultures where this appreciation of sound is totally different. So this points to the direction that any kind of oral or visual perception is a social construct. So we have to take into account that the culture we are investigating basically, so we have to deal, for example, with the conception of music that these people could have had in the past which was totally different from the current one, because they had a completely different vision of the world. And also, I think it is impossible to totally reconstruct this aspect, the subjectivity of the past, but the most important thing to remember is that it is useful for us why we reconstruct these aspects. I mean, we learn about this and we make more ground for wider discussions. I don't know if that answers the question.

Oh, that's definitely very in depth, thank you very much. We can't of course talk about art and subjectivity without referring quickly back to Andy and Izzy. **I wonder if you have any thoughts on this in relation to your own project?**

Andy: Yeah, it really resonates actually. I would say, we have an interesting dynamic, I think, in that the collection, that's the foundation of our work, which is a material from Montastruc, a French Magdalenian site and it's been stored in the British museum for a protracted period. It's relatively well-studied and there are really great artistic drawings of them, you know, so, trying to extract the pertinent information from the surface. But captured within that is a particular way of seeing, if you like, so the subjectivities, if you like, kind of come with the drawing process. On the one hand, it creates a really easy to work with rendering of the surface, extracted from all the mess of the piece of stone itself. But if you use a method like 3D modeling, in this case, we used a white light scanning, so very high resolution and very accurate... millimeter accuracy. This almost allows you to re-ambiguate your surface and kind of see it in a different way, how those engravings interact with the stone surface itself. And in particular the way you can manipulate that surface, change light positions and so on, really allows you to start to appreciate more the relationship between the engraving, which we tend to think is the art and then the engraving as it sits on the rock, which I would contend might be a more sensitive way to explore the art within a prehistoric context. So I think the tool in hand here and I'm not trying to sort of advocate for a simple replacement of one [...]. Both techniques I would consider to be really valuable. It does allow you to see the material in a different way, I think, which I find really valuable and in particular with a collection which is quite well understood, quite well known, and it's been quite well studied over its life in a museum context. I think the use of a digital techniques such as 3D models can offer a lot of new avenues for research. And in particular - maybe Izzy could join in here - it allows us to use things like 3D models we've collected several years ago, repurposed them and bring in some in like VR, which has a lot of potential applications as well.

Izzy: Yeah, sort of exactly what Andy said, being able to use these 3D models, so then almost place the engraved forms back in their kind of immediate context of how they relate to the stone and then manipulating that further to explore different light levels. If you recolour the models to make those engravings a fresh white again, how that then changes your understanding of the object. I think it's really exciting but like Andy touched on, I don't think it's as simple as replacing one with the other and actually they work quite well together because sometimes it's quite useful to be able to see the the engraved figures quite clearly, which drawings offer, particularly when you're then trying to recolour the model. And it's difficult to pick out the lines in the 3D model that you have, but also equally it's then important to look at that within its immediate context and look at how the ambiguity of the art almost changes, understanding and interpretation of our object.

Thank you so much. I'm really interested in this whole concept indeed of using scientific approaches and more, shall we say, technical methods to look at something like art subjectivity. It seems like things that shouldn't work, but all of your papers have shown how well this works, which is really nice. Thank you very much, everyone.

Our next question is for Jess: **Would there be a difference between usewear traces created on a hand driven awl, versus for example, a bow or a pump drill bit?** I guess Andy, as well, if you want to add to it?

Yeah, thank you. It's a really good question and one that certainly Andy and I are really, really interested in. So really in terms of the production of polish, we saw certainly the difference between hand driven and bow drill, that the bow drill, because of the pressure you're able to put behind the tool, you can kind of... the polish develops kind of more intensively but it certainly... the effort that you need to sort of like haft the tool and then use the tool...it just for us seemed a little bit overkill.

Like you can really work quite easily with a hand held awl and then you don't need to worry about hafting it and making sure you've got [...] adhesives or wrappings around the tool. But we thought perhaps for a sort of larger production of a beads that perhaps hafting would be in the long term... you'd get a better return because obviously you can kind of drill more and more quickly, but generally in terms of the microwear itself, we didn't see a vast difference in the production of polish. One thing I would say is that we're interested in the idea of tip snapping potentially being more frequent if you are hafting the tools, or if you're using a bow drill, you might get more... cause you're exerting more pressure on it from a downwards force, it might be more likely that you might get tip snapping from that, whereas with a hand driven awl, we didn't see any kind of tip snapping, even with quite hard materials. So yeah, that's something that we're looking into and hoping to explore more, if that answers your question, but Andy as well, he did the experiments, can probably add a bit more to that I'm sure.

Andy: Sure, I can add briefly to that a bit more just to reassert Jess' point there. I think as with any set of experiments, there's always more that we would like to try and do. And I'm really keen to expand the range of techniques that we try. Most of what we've tried at the moment have been working with awl, most by hand and then, using a hand drill, almost like you might use a simple fire drill technique sort of rubbing a stick between your hands, if you like. And I'd like to try and scale this up into [bore] drill and pump drill, but I'm sort of working in order of what we have the most direct evidence for, [art] culturally speaking. So I'm moving from the tool itself, for which we definitely have evidence, into we have some hafted examples and trying different types of hafts and then the bore drill, which is sort of making the greatest leap, if you like, as we don't necessarily have preserved examples of those at the site. So we're sort of working through those in order and we're very sensitive as Jess has noted about the potential changes. So far it would seem that the [...] of polish development might vary by technique, but they tend to come out looking quite the same and they tend to even out the longer the tools are used. And in terms of the [pieces] themselves, because the [shell] is so soft and so thin, only about three millimeters typically as its average [...] thickness, it's really, really quick to make these really and really simple. And so Jess says, I think, probably, you know, making the awl itself might be the more complex job if you like, [...] technical skill.

Thank you very much and the next question is for [Anita](#), also maybe Aimée might want to give something or any of the other YEAR people. So, but Anita: **First of all there seem to be so many opportunities for looking at different materials and technologies.as a student at York. Would it be possible for students to engage in projects working with materials or with technologies that are not included in the specialization of the lecturers or the resident researchers?** So I don't know who wants to take this, maybe Anita, you can start and see how it goes.

Okay, thank you for the question. I will kick this off by telling you my point of view as postdoctoral researcher, but I think Aimée is better placed than me as director of the YEAR Centre to answer. I think there is a lot of potential because of the way YEAR is structured. For me I choose the YEAR Centre to do my research on the [Wellcome Trust] because of the connection and the proximity of the lab and the space. All the point of being here is to be able to connect with other people and set it up as we grow, it has an incredible flexibility. So for example, when I started a lot of the focus was on prehistory and it was expanding to the Middle Ages. Now my research also involve ethnographic research, not all is experimental archaeology. And so I'm feeling very happy to actually be able to contribute to a new venue within the YEAR Centre. And this is fantastic, personally I found that everybody there is very helpful to create the connections that are necessary. There is something very special, you know, that when you are creating, for example, a reference collection like mine, that is for experimental archaeology for dental calculus research, it will be used by many other people from

now on. So yes, I do believe that the goal of the YEAR Centre, at least by my point of view as a researcher is to expand, temporally and with technology and knowledge.

Aimée : You've given a perfect answer there, Anita. Exactly that's what we're trying to encourage. We've got a really broad range of research happening now through, you know, throughout pretty much every time period and different materials. So for example, I personally have a PhD student, Mike Groves who's working on wood craft, and that's not related to my own specialization, it's completely different, but of course there is that kind of common theme that runs throughout, which is craft. And I think a lot of us have that as a point in common in terms of our interests, but we're very interdisciplinary, we work a lot with bio-arch researchers as well. So we're interested in sort of scientific applications to experimental archaeology, but increasingly we're working on digital imaging, as you can see with the work of Izzy and Andy. And so integrating all of these different techniques, really, with experimental archaeology, which I see is really exciting and one of our strengths. I'm not sure if that helps.

Matilda: Sounds good. Cause I can imagine, I guess, as a student looking for somewhere, it might be potentially unnerving to decide where to go for if you don't see it.

Aimée: I wouldn't expect, you know, I'm happy to supervise projects which are not specifically related to my periods of interest or the materials, because I think that experimental archaeology as a methodology, you know, is something that is central to pretty much every time period. And we're such a sort of unit now in terms of our research group, that we can benefit from the expertise of each other as well. So a student could easily fit in with whatever is happening there. And the YEAR Centre is already sort of buzzing place to work, and we all kind of bounce ideas off each other as well. So, yeah, it's a very interactive workspace.

Okay, great, thank you. So for all your potential students listening in, do not be put off, you can do whatever you like. Okay, thank you very much Aimée and Anita. So the next question is for Anja and for Morten: **In some of the clips shown in the presentation the bone was being worked using a lever as sort of protection on the leg while in others it was wood, for example. Do you also find archaeological evidence for these byproducts of the manufacturing process?**

I can start there and then Morten can take over. No, I think, what we do have archaeological evidence for are the grinding snaps and various grinding tools. Of course we can't know if they were used like this, but I think that's one of the really good things about the experimenting is that you really, you see how... you experience how things work. That grinding slab sort of almost works like a little table or a very good place to work with things. Concerning the skin, that's more for protecting your clothes and we don't have any evidence for that. Morten, do you want to fill in something there?

Morten: Yeah, I can try. As you said we do have evidence for the grinding slabs and the rest is just protection. I think also it's tedious work, it wears hard on the bodies. You need to find your own sitting positions probably [...] in prehistory as well. I guess it's just the health environment and safety where... I'm doing things in the way you find it most comfortable since we don't really know, it's just a matter of like finding good ways to doing it, I guess.

Yeah, no, that's really interesting. I actually related to this cause I mean the sort of cross-craft interaction, shall we say, involved in the manufacturing process seems quite intricate.

So there's so many different types of flint tools, it seems, that you use to create just one fish hook. Do you think therefore that the people, the bone workers or the fishermen would have also had their own set of flint tools or would have known how to make the flint tools?

Definitely in the Stone Age, or let's say [...] in the Mesolithic and in all the periods that we've been studying here, we assume that people will be making their own flint tools. It's a simple technology, it's light technology. You can make most of the tools in 20, 30 seconds, if you already have a blank. So it's pretty easy. So you don't really need specialists for the flint knapping. So I think that these people were quite versatile and they made whatever tools they needed when they needed it.

Okay. That's very interesting though I like your mention of 'Oh, it's easy to make a flake' speaking as someone who can make flakes very easily. I'm definitely not one of those people. So I would have been a terrible fisherman back in the day I think.

Anja: I would say that those experiments, we couldn't have done them without Morten's universal experience with so many different Stone Age techniques because you would never...., it's difficult in modern times to gather all those things you need, especially the grinding tools, you know, they come from special areas. It has taken Morton years to sort of gather all these materials and gather the flint. I think also, Morten, you say it's very simple, but that's because you have 30 years of experience of course. It would have been very simple, I suppose, for Mesolithic people who have the experience, but I think one important insight for example, is the use of microblades. Seen from how we are proceeding with it, the thinner, the better. So that those kinds of tools that are often not considered very interesting, it's you know, little broken pieces of microblades here and there not given much attention in general, but you really see the value of those tools when you work with bones, because little microblades or bladelets that you can snap off the edge when it gets used, then continue to work with it, it works so well, you don't have to haft it or anything. You'll just use it in the hand. It's sort of an expedient tool, really, I think people were in the past quite conscious about what kind of tools that they were using for fishhooks in particular, because they're very small. A lot of them are very, very small. So you need a small microblade. It works well with a small [hand]. So yeah, it gives very interesting insights, I think.

Because I also see you mentioned the presence of blanks and sort of pre-forms in the archaeological record, and if the tools used to make them, especially in those later stages were a lot smaller: **Do you think it's possible that they would have been made kind of on-site waiting for the fish to bite or would the fishermen have taken a set of completed fish hooks with them?**

From my experience, from making these tools, I assume that it's actually something they brought with them. It's too time consuming and you need to have your focus on the fishing, I guess. Like, I think that's the same as you see in ethnographic studies that when people have idle time and maybe that's also the reason why they're actually found inside the huts sometimes, that people were actually like in winter, for example, you make these things because you have the time, you can't really go outside that much. These people were constantly working on something, it's not like today when people have spare time, right? So it's actually, I think that the fish hooks and harpoon points and all these things in bone and antler that maybe they were produced in social contexts. When people were sitting around the fire, with just enough light, then they could keep a conversation going and you make these things in that kind of setting. So I don't think that they would be doing it while doing the actual fisheries and stuff like that.

Okay, thank you very much for your answers. Our next question is for [Victoria](#).

How were the blown vessels annealed and was the glass which was to be recycled annealed at all?

No, the glass was not annealed. There's a couple of reasons for that. One was that it just wouldn't have been possible for me to have been able to build a separate annealing chamber and all that. But also there is no need to anneal the glass for the questions that I was asking. So I believe in the [...] the YouTube comments the person who's asked this question was saying about that it could affect the composition of the glass. Glass is actually incredibly stable, when it's below melting temperatures, it's

very inert so that it's very very unlikely that there could be any chemical interaction between the glass and the furnace in the annealing chamber environment at that point. You could get some surface dulling that has been caused by ash but that would be something, that would be a vessel that has been incorrectly annealed. So you could maybe get small amounts of contaminated glass like that going back into a batch but most of those vessels would be discarded if that happened. So if it's annealed properly, you wouldn't get that surface deposit anyway and the glass itself compositionally would not change. So there was no point in annealing because in my case..., because it wouldn't have affected my overall results and it would have been an enormous use of resources.

Sounds fair. I see actually, indeed, there's a lot of questions for you but I might suggest maybe rather than me going through all of them, I know that also the person who asks the questions is on our Discord server. So perhaps you might be able to go there after this and have a more in-depth discussion via text. So apologies, Frank, I'm afraid I won't read out all your questions, but it's very nice to see how interested you are in Victoria's talk. I do, however, have another question for you, Victoria, as an ignoramus in terms of glass making and the sort of chemical compositions.

So you did mention in the presentation, for example, that a decrease in sodium would then increase viscosity, but what are the practical implications of the sort of changing amount in the other elements present across the five days in relation to those, the [length], softness, homogeneity, et cetera?

When we have a glass that is made primarily with wood ash, as opposed to [...], those glasses generally are shorter. And so they have a shorter sort of working range. So you might expect that with significant amounts of contamination by potash and phosphates in particular that you might end up with a glass that was shorter and therefore you would have less time to work it. But that would probably take a quite significant amount of contamination before you would start to see those facts as [...] experiments are kind of showing.

Okay, interesting, thank you. Keeping to the subject of glass, we have a couple of questions for Sue. **How thick were the chips of millefiori cane that you used? Were thicker or thinner pieces easier to attach?**

Well, this is a very interesting part of the whole, and it just shows how brilliant experimental archaeology is because I came at it with preconceived ideas and I found out so much when I varied the different size of chips. When you've got a cane, a slice of cane that has got little dots, well, stripes down the side of it, the edges of it, because you've got to think of a cane as a three dimensional object and you're cutting slices and so it's a bit like a slice of an orange and on the peel of the orange, there are stripes going down it, which will show as little dots, if you just look straight down on the slice. Well, if you cut a thick slice of cane, then as you melt it into the bead, the center of the cane sort of implodes, I don't know... I can't find a technical word for this. The very center sinks into the glass and the sides come up. And so you get a star effect from these stripes around the outside, and it completely changes the visual pattern of the cane. So I've been looking at some of these beads to see whether this was done deliberately in these mosaic beads, in the millefiori slices. And I think possibly they must, they were, they most certainly did. They would have cut thicker slices so that the pretty patterning on the outside that would only show as dots, if you're looking at the section, were turning into beautiful starbursts, so all round it. At first I was very random how I cut the cane slices, I was very bad at it. And sometimes I had thick ones and sometimes thin ones, using a hammer and hardie to chop them up. But the results... it was good because it meant I got a lot of variety and I was able to see this extraordinary result. Just a PS on that. If you apply a slice and then you press it with a knife blade into the bead as you go, then that seems to prevent... it sort of flattens the slice. And it seems

to prevent the sides coming up quite as much. So you can adjust, but yes, the thickness of the slices has quite a large impact on it, a very interesting question.

Just sort of related to that, by the way, your video was fantastic. Thank you very much for making it all so clear the process. I really appreciated that. **How much time would you say it takes before you kind of master the art of this sort of bead making? So for example, being able to heat all those different layers enough to kind of melt that one in place, but not melt that one and all that kind of thing?**

Well, I've been working on the hot glass beads... I just had one lesson about two years ago, I suppose. The brilliant man who works in hot glass and bead making, [Mike Pool] up in Todmorden and he, after that, we've mostly been in lockdown so I've been very much on my own and just working at it. Yeah. I probably work at the glass three or four, two to eight hours a week and amongst other things. But the millefiori side of things has been the hardest of all. I think of all the crafts that I have done in my life - and I've done a lot of jewelry making and silversmithing and working on stone and so forth - this has been the hardest of all. And the millefiori is the hardest of all that. The disasters I have had have been absolutely spectacular, melting Bob's spitting glass, really getting it wrong, much easier to do, just adding stringers to make, decorating polychromes or twisties and so on, but the millefiori, well, that has really, I've had to work very hard at it.

Do you, out of curiosity, see similar kind of accidents or messed up beads or explosions in the archaeological record as well?

Oh, certainly. I've been looking at a wonderful collection of beads from central Europe just recently, but the mosaic beads with lots of the canes in, and I can see where they've gone wrong. And this is giving me a fascinating insight. You start seeing handwriting in this very difficult material, in the hot glass at this tiny scale. And so where as experts can recognize the different people's handwritings I'm beginning, certainly with the Anglo-Saxon beads, I'm beginning to see the same hand, the way a man or a woman will be adding the decoration and maybe having the same problems and struggling with them. It's all there, you can see it preserved.

I imagine it's also very nice to see that these alleged, you know, specialists, craft specialists in the past also had the same problems with doing these things.

Yes, very reassuring. Next question is for the 3D model team at Jarrow Hall. So GianLuca and Rebecca and Marco. **So if I understood correctly in the video, it was mentioned that possible alternatives in architectural design could also be investigated through adapting the 3D model. Has this been done already? And if so, what are the initial results or observations?**

I think this one is for Gianluca, because I think if I well understood it's about the grandstand, which in this moment...it's not an experimental reconstruction what we did...what we inherited there with the grandstand. It's just a mimetic structure inspired by the grandstand found at Yeavering. However, all the [coverings] in wood are now...they're now not in place anymore because they were not properly maintained by the previous management. So I think Gianluca can explain what we are trying to do alternatively within the project of the general redevelopment of the village. We've got funding Bede's obviously going on to redevelop completely the village, which is not a village, but you know what I'm talking about, our open-air area and the entire grandstand situation, the structure will be modified and improved according to the archaeological record. But Gianluca can tell you why, why the 3D project is so important for that.

Gianluca: Yes, thank you, Marco and thank you for the question. I think to be [...] it might be useful to focus [for written moments] on the grandstand as Marco said. What we try to do already has been

like considering different options for the stage and the grass based on the archaeological excavation. So in the area of the stage there were found several postholes indicating that the presence... probably that the presence of screens behind the stage area, of wooden screens or something like that. When we add these screens to the model, it can be done really easily in AutoCAD and then transfer the results in the audio software to simulate the acoustics. We see that it completely changes the acoustic of the side, for example, especially the voice of a person speaking from the stage area is reinforced considerably from that point from the presence of the screens. There are a couple of slides in the presentation about this actually. Other things that we are currently doing is to investigate different aspects, for example, in the [Thurlings] building from an archaeological point of view considering for example, the presence of a different configuration of the windows. And also we can try to investigate the life inside of the building, because we know that the building that was found at [Thurlings] had a different orientation. So that changes a lot in term of light inside the building. So we can try all of these different options. As I said before it is rare that we get to a single answer, but at least we have..., we can consider equally all of the different options without putting too much emphasis on just one that might be only partial. I don't know if that answers...

No, that sounds very clear, indeed, yes. And like you say, it's then nice because you don't have to spend all the time and effort in building something just to see how it would be. You can just do it through digital methods.

Yes, and if you chose to then to realize a new experiment you can have a background with the digital models to see which kind of questions you are going to address with the new experiment and with the new construction. So you can try to make some predictions, let's say, and then test them to see whether they work or not. This is quite a useful thing.

Definitely, definitely something I think we've had a lot of talks about, house building and that sort of thing here. So I think that would be something that would be very useful for other projects as well, probably. Thank you very much to the Jarrow Hall team. Next question is for Anita: **You mentioned wear on the teeth especially in relation to their use as a third hand. Could you elaborate on this?** The questioner has said: **I've seen some effects on teeth from pine needle basket weaving. So what crafts have you identified?**

Okay, this is a very complex question because... and is part of the reason while I'm looking at micro debris in calculus, because dental wear can be the result of multiple activities, sometimes a combination, and it's also [...] how hard the material was. In different places, in different periods of time people put through their mouth different things. So we can only grasp an idea that people were using the teeth for [certain type of] crafting activity, but without really narrowing down with great precision, what they were and some maybe still unknown. So I found particularly interesting, particularly [useful for now] try to develop an idea of what the, for example, textile fibre, what type of textile fibre entered the mouth during textile processing and work, or also basketry, what type of debris is produced and if we can try to link it to a specific type of craft, like for example, basketry. In conjunction with dental wear, that may be not super diagnostic for that specific craft, there is a lot of work to do because in different places around the world, people use different materials. So we're just beginning here. But there are a lot of potential. I think one of the things that is very interesting now, at least in my field and with experimental archaeology is really beginning to look after the connection of these [...] of particles into the mouth during crafting activity. And now they can be... if retrieved from ancient material, how they can be worked in with other lines of evidence from the scale [...], from the calculus itself to really strengthen our interpretation. Did I answer your question? Is that enough?

I think so, that sounds very, very filling. Questioners are usually quite good at following up in case it hasn't been answered. So we will keep an eye on the Discord and see if they ask a question again. thank you, Anita. Thank you.

Next question is for Jessica: **Would you consider experiments with multiple drillers to allow for differences in technique between the experimenters?**

Thanks for the question. I guess by multiple drillers you mean multiple experimenters?

Yes, I think that sounds good.

Yeah, so it's a really interesting point. It's something that we haven't looked into just because, I mean, Andy, as he mentioned in the presentation, he has lots of experience and so we're really, I guess, looking for more about... we're kind of keen on working with people that have an understanding of the material and the way that you can work the material. And I think, obviously, Andy with his experience and he can speak more to this probably after I finished trying to answer the question. But yeah, I think it was more about having someone that has experience with the materials and sort of the limits of the materials and the production methods. I think variability in using different drillers is something that we could definitely look into, although I think at the moment, we're more interested in trying to look at the variability of microwear production between materials and between production techniques rather than variation in sort of human action. But, yeah, as I said, that certainly is another area I think with this topic and with these experiments Andy and I found that there are so many avenues that you can go down and so many rabbit holes to go down that you can sometimes get a little bit lost. So we're trying to keep focus, but that's definitely a possible future avenue to look further into, and I'm not sure Andy, if you wanted to add anything to that...

Andy: Yeah, sure. So as Jess said, I think, you know, the more we look into this, the more interesting it gets really, and with all the, in particular, in the site that we're looking at Star Carr, we started to realize that there's a real diversity of use with this tool as well, from the point of view of the contact material. So, we're trying to diversify the range of materials that we're trying to use beyond just a beat on the one hand. And I'm sure as our research progresses and as Jess has articulated, this would be a really great area to bring in as well, to see quite how different people might attack the same problem, the tool set you might want to use and so on. So I think it would be a really valuable addition as we continue to try and expand the project and think about the relationship between particular tool forms, their particular setup and, you know, whether they need to be hafted or so on at a site like Star Carr, how we have evidence for both, if they're a more specialist tool or not, and then absolutely the range of experience that the experimenter might be able to bring to bear. That would be a very valuable contribution moving forward I'm sure.

Thank you for that. And I mean, related to that Anja and Morten, so if I understand correctly, Morten was the kind of central experimenter, shall we say, but you also mentioned investigating skill as an idea, within your research. So perhaps you might want to add something to this based on your own experiences?

Anja: Yes, since we started with the fish hooks, I was the completely unskilled woman that had never done it before. So I had originally an idea for a research project to try to investigate skill more thoroughly by bringing in a range of people to try it and you know, to make a test to see how quickly can you learn it? Can children learn it that way? We haven't got so far yet. So far the investigations into the skill is based on, you know, how I'm progressing with doing it.

Matilda: No pressure then.

I have to say it takes time to master it, definitely. It does take some skill, but I mean, that's what, of course when you are starting with it when you're a grown up is very different to the prehistoric situation where you would learn this kind of craft from a very young age. It would probably not be very difficult to do it. So it's a bit difficult in that sense to get a good grip on the skill, but I think also a lot of the work has shown that even time is maybe even more an issue than skill, especially when it's the Mesolithic fish hooks. The Neolithic ones are definitely more complicated to make. But the issue of time, I think, is very important in actualistic experiments. You really get the sense of how much time it takes compared to, for example, making some flint flakes. Sometimes we have been laughing about, you know, whether it should be not Stone Age, but the 'Grinding Age'. They must have spent a lot of time grinding. And you also see this when you look at the sites more, you know, the overall activities at Mesolithic coastal sites in Norway, grinding is also very important in stone technology. You have lots of stone axes, which have been ground. So it's, I think people have been able to work back and forth between different material categories, sliding off from the skill there now...

I noticed that avoidance... No, thank you. That's a very interesting answer. I don't know, Morten, if you have anything you wanted to add to that?

Morten: I kinda think that most of it was covered and I drifted off a little bit... I think Anja overed it quite well I think.

Perfect, I think that's always nice. While I have you both here though, I have some more questions. **Sometimes the lower jawbone of animals, so cattle or maybe deer, has been used in the production of fish hooks as well as the [...] of the joint has a useful shape for that. Have you tried this?**

No, never. And, and the reason is in our research area, like Scandinavia, you don't find any evidence for it. I know that people make them in experimental studies elsewhere, but for us it's more like we focus on the ontological material that we have. So, no.

Okay. No, that's a very clear answer. Thank you. A little bit of a more broad question: **Did the different fish hook practices allow you to infer different kinds of fishing styles or differences in the role of fishing within the Mesolithic to Neolithic transition?**

Obviously it looks like the Mesolithic fish hooks are made mostly for local fisheries, like small fish. I don't know exactly the English word for that kind of fish, but it's the most common fish, like anybody can just catch it. And I think that like the bigger hooks, in the Neolithic, they seem to be like more focused on really serious fisheries, deep water fisheries. So it seems a little more prepared and organized, skilled [...] in a way.

Great. Thanks. I didn't know if you want to add to that, Anja?

Yeah, I think what we see in the archaeological material. There are two really basic differences. The Neolithic hooks are, well, they're made in a completely different way, and they're often much bigger. You also have at Neolithic sites a variety in sizes, but you have in general some really large sized hooks which I think might have been used... there is evidence for fishing of bluefin tuna, for example, a really big fish. And that will be a type of fish what you could also take by harpoon, but I think it might indicate that they were going a bit for the bigger fish in the Neolithic.

Okay, that's interesting, thank you very much, both of you for your answers. Victoria, I have a question I suppose, aimed at you, but more about EXARN rather than necessarily the glass research. **So what advice would you give to other experimental archaeology students or groups of students who want to start their own more official organization at their own universities. And also what would you have done differently in the creation of EXARN as a group?**

Victoria: Marco, do you want to chime in on this one?

Matilda: I was going to ask if Mako was also involved in this yet.

Marco: Yes, me and Victoria, we were both there when we created EXARN. What would have we done differently, Victoria? I don't know, what have we..., I think, so, the most important thing - and ask Victoria if she agrees with me - is to have a good team, you need to have a good team, initially most of all, because you need to create the proper network. You need to present the project within the department. You need to speak about your project within the department and make sure that lecturers and members of staff, because at the end of the day, our group is made by students and it's a student-led group. So, we needed that staff support to officialize a little bit better the group to access funding opportunities. And so, this is really important, the network within, within the department and then secondarily obviously to expand the network outside, as we did initially, organizing the conference EASTS and then you know, now a conference which now is a traveling conference, as we say and then another second important point is the connection with an art museum or an open space, an area that you can actually use for the experiments, not only for the experiments though, I'm a strong believer in a complete cycle of the experimentation, which starts obviously with the research, with the questions, but also takes the opportunity to be transformed in an event in an occasion of education and communication for the public. So, we established that connection with Jarrow Hall, since the beginning, even before establishing officially EXARN. And I think that's really important. I imagine our colleagues from the YEAR Centre will agree on that, as obviously, they also have an open area. In Newcastle University we don't have a specific area, where you can do experimental archaeology. And this is why we established since the beginning this relationship with Jarrow Hall. There are some projects to expand our relationship, Victoria, if you want to mention that?

Victoria: Yes, we're currently working... , well, Newcastle University staff are currently working on setting up a permanent experimental area. So one thing I was going to say in regards to..., it's kind of advice on setting up yourself as a group more efficiently. So we weren't able to set ourselves up as sort of an official research group within the university because there isn't really a mechanism to do that as students and that may well be the case at other institutions. But what we have been able to do is affiliate ourselves with MATCH, which is a faculty research group and by doing that... that's basically allowed us to kind of have this more official standing. So if there is sort of a pre-existing research group particularly I would say you could find one at faculty level, that your sort of experimental group would fit into their sort of wider remit. But it's really affiliating yourselves with them is a really good route to go. If you can't, set yourselves up as sort of an independent official research group. I hope does that make sense.

Perfect, thank you very much, excellent advice. So for all of you students out there, there's hope to start your own official group as well. I have a question for..., I'm not sure if it would be best for Gianluca or Rebecca. But **have you also had live concerts or recitals at Jarrow Hall or the other sites as a comparison with the results of the 3D model experiments?**

Rebecca: Not yet, but we that's what we're aiming to do, to sort of also integrate music performances in the model. We want to like record in situ with binaural instruments, but also have anechoic recordings to introduce in the model. Maybe Gianluca can explain this a little bit better.

Gianluca: Yes, thank you, Rebecca. We are aiming for the [part concerning audio] further to the [binaural] recordings that Rebecca mentioned to record some anechoic tracks using, for example, experimental reconstruction of Early Medieval instruments or passages [...] in old English or things like that. And to test all of these sounds in the different parts of the building or the buildings and with

different architectural options, so to see for sample whether the speaking transmission..., or the clarity of the speech was good enough or was better in certain points of the buildings or in other points of the building. So the auditorium software which we're using for this experiment, digital experiments, allows for running anechoic recording. So basically tracks where we have no reverberation at all to simulate the reverberation in the digital room, and again, this will present us with a series of options and we can explore all of the different options. So far, for example, we've seen that the [Thurlings] building [A] is a very dry building, that has no reverberation [...], very, very, very low reverberation and it has no [...] points. So wherever you speak inside the building is more or less the same for the audience, while the grandstand is completely different, especially with the screens that seem to have been detected in the archaeological excavations. I hope that answers.

Perfect, thank you very much. Sorry. Did you want to say something else?

One little thing, from a volunteering point of view, from a stakeholder point of view. To do these recordings, we involved two of our volunteers who are members of the Friends of the World of Bede, which is our sort of academic group of volunteers, more academic group of volunteers dedicated to the Anglo-Saxon archaeology. They're members of Regia Anglorum, so a living history group. They do reproduce, let's say reinterpret, what could have been some early medieval music and Gianluca managed to organize the recordings in Newcastle Uni through the department of musicology, if I'm not wrong. So this is just to say that, from a research project, which starts from a specific question or a set of specific questions, in terms of a project for an open-air museum like ours this creates a series of opportunities for a series of scholars, of volunteers, members of the public, to all contribute in the research. And in the end I see it as a little bit of a community project.

Okay, Aimée, I see you would like to comment on this.

Yeah, I was just going to say that I think it's really important to have staff involvement because..., I think really from a continuity perspective as well. If you want to set up an organization, an experimental group for it to continue and to continue to have strength, I think you need to have permanent members of staff who are involved in that, who can carry it forward. So I would say that's one of the tips I'd give. And I think that, you know, the proximity as well is a really important thing for these centers, to be able to have them on campus, with access to the different labs, et cetera, I think really opens up so many more kinds of research opportunities if and where possible.

Okay, thank you very much. actually, Aimée, I did have one last question for you. So I mean, a lot of experimental archaeology we've sort of seen, this can be quite physically demanding where you need a lot of skill for it but also mentally rewarding as is pointed out in the video that you and a couple of the others from the YEAR Centre presented. **How do students or other participants in your workshop or your crafting events initially react to the activities they undertake and how would you encourage, for example, professors or lecturers or other universities to encourage students in experimental archaeology?**

Aimée: That's an excellent question, thank you. This is really, I mean, this work is very exploratory, so we're just trying to, I mean, Anita's work is very much focused on physical health, but we've realized that experimental archaeology does have a role to play in mental health as well. And that's really just through our own teaching practice and sort of reflective work where we see how it has a positive impact. I think it's just that kind of hands-on practice-based work, working outdoors, interacting, socializing with each other has a really strong role to play in all of that. Andy, do you want to talk about your work this year?

Andy: So, obviously this year had interesting challenges for all of us who are involved in experimental archaeology, whether in terms of research specifically or teaching specifically or indeed research-led

teaching depending on a particular configuration you might be working on at a given time. And of course with the new group of students, moving into a new environment, a new city, a new workplace, et cetera that adds interesting new challenges in this as well. And so I think from, you know, working anecdotally, as Aimée rightly says, this is exploratory work here, something that we've been sensitive to from the inception of the Centre moving forward with our new cohort of students in particular, this was a really important opportunity where the activity itself, the act of doing, of making, of working within a community environment, working collaboratively on tasks that might not be completely familiar, was a really formative experience, I think, where a lot of other avenues for socialization, for network building and so on might have been negotiated differently typically in more online formats. So, it seems to have been a really important opportunity for students. And that is [has been] particularly easy for us to see this in this particularly strange environment we find ourselves in. And I think sort of building out from that, it seems an interesting question for us all to ponder perhaps in that, when we're trying to do these experiments, when we start to zone in, if you like, start to get lost in the activity itself, what does this really say about our minds? What does it say about the relationship between activities of this kind and health? As much as it might take a particular demand of the physical body, it's all evidently interacting with the mind somehow as well. And so I think in this exploratory research that we have started, we're kind of interested in both sides of that equation, really, in every context, whether it's about research and how we engage with what we do and perhaps how [...] ancient hunter-gatherers engaged with what they did, our students learn this for the first time and how they learn about creating objects and the process of doing that. Thank you.

Just one last thing before we wrap up, Sue, as an independent researcher, do you have any sort of input on this from your own experience, from the other side, shall we say?

Well, I suppose, I was very much enjoying going out and before we had the pandemic and connecting with people that I had known from years before, and the experiments seem to really reach out to more than just archaeologists. People get very fascinated about this idea of trying to get into the souls of the long ago, peoples and well, personally, I've been saddened that I haven't been able to contact or continue with my trekking around all the museums of Europe pretty well. So that's on pause at the moment, hopefully to continue, but this conference has been wonderful and I have very, very much enjoyed so much all this connection with everybody again. So thank you so much.

I think I'll finish it there. Thank you very much to all our speakers.