

Science and Technology Select Committee

Corrected oral evidence: Forensic Science

Tuesday 9 October 2018

3.25 pm

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Members present: Lord Patel (Chairman); Lord Borwick; Lord Fox; Lord Griffiths of Fforestfach; Lord Hunt of Chesterton; Lord Kakkar; Lord Mair; Baroness Morgan of Huyton; Lord Vallance of Tummel; Baroness Young of Old Scone.

Evidence Session No. 1

Heard in Public

Questions 1 - 12

Witnesses

Professor Tim Thompson, Professor of Applied Biological Anthropology, Teesside University; Dr Karl Harrison, Lecturer in Forensic Archaeology, Cranfield Forensic Institute, Cranfield University; and Dr Sarah Morris, Lecturer in Forensic Computing, Cranfield Forensic Institute, Cranfield University.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witnesses

Professor Tim Thompson, Dr Karl Harrison and Dr Sarah Morris.

- Q1 **The Chairman:** Good afternoon, lady and gentlemen. Thank you for coming today to assist us with this inquiry. This is our first session of an inquiry that will last for the next few months on the issue of the use of forensic science in the Criminal Justice System and in other areas. With your background, we are particularly interested in the scientific aspect but we will also have some questions for you on other areas. Before we start, perhaps you could introduce yourselves for the record, starting from my left. Please say who you are and who you represent, if you do represent anybody. If you want to say a brief word, please do so, otherwise we will move on to the questions.

Professor Tim Thompson: Thank you for the invitation to come down this afternoon. I am a Professor in Applied Biological Anthropology and Associate Dean in Learning and Teaching at Teesside University. My background is in forensic anthropology, an area in which I have also practised and done a considerable amount of research and teaching. I am a Fellow of the professional body, The Chartered Society of Forensic Sciences and also of the Royal Anthropological Institute.

The Chairman: You also have a background in another good university.

Professor Tim Thompson: Yes, that is right.

Dr Karl Harrison: I am a director of a specialist forensic services provision company dealing mainly with forensic ecology. I work primarily as a forensic archaeologist and I am a visiting professor at the University of West London.

Dr Sarah Morris: I am the head of the Digital Forensics Unit at Cranfield University. I also run the MSc in digital forensics. My background is in computer science and artificial intelligence and I specialise in document forensics.

- Q2 **The Chairman:** Thank you. Would any of you like to make an opening statement? If you are happy, we will go on with the questions. To kick off, can you tell us what you think are the current strengths and weaknesses of forensic science in support of the Criminal Justice System and how you might improve that?

Professor Tim Thompson: Talking from an academic university perspective, which is where I have most experience, I think we have excellent education facilities and excellent courses which are training good graduates in the forensic sciences in a range of disciplines who are coming through. We are engaged in high quality research in the university institutions which are contributing to forensic science. We have some good collaborations between our university institutions and private forensic providers and various police forces and there is a commitment from a number of universities that work in this field to support the Criminal Justice System. I would say, however, that it is a bit patchy and fragmented in its approach.

Dr Karl Harrison: To add to Tim's comments, if I may approach that question from the perspective of practice, one of the key strengths the UK has is the breadth of practice in the range of different scientific disciplines that have applied themselves to forensics. The challenge is how to maintain that breadth in the current system.

Dr Sarah Morris: The only thing I would like to add is that digital forensics in particular is an incredibly fast-moving area with a lot of new technology appearing all the time. Trying to keep up with the latest scientific techniques and how to work with devices makes it a very research-led field, and that can be difficult for us. However, the people on the ground are very committed to doing that, so that is a real strength.

The Chairman: How strong are academic institutions in all of the areas of forensic science? How would they compare with other countries?

Professor Tim Thompson: It is probably fair to say that institutions have different strengths regarding their areas of expertise. On the delivery of higher education courses, we have the QAA scientific benchmark, which we adhere to, and our professional body, The Chartered Society of Forensic Sciences, has an accreditation scheme whereby courses are signed off or not, depending on the quality of their provision. It is probably fair to say that much of the forensic university provision is in the post-1992 new universities. There is a bit in the traditional Russell Group universities but it is largely focused on the more vocational institutions. However, on the whole the quality they deliver, in terms of the graduates our universities are producing, is high and comparable to other countries.

Lord Fox: Mr Harrison, you alluded to a challenging environment. What is this environmental challenge to the profession?

Dr Karl Harrison: It is implicit in your question that it is seen as a profession and that there is some consistent whole across forensic science. Many of the specialisms that we deal with might be absolutely pivotal to an exceedingly important criminal case but might not be used very often by police forces. As a consequence, some of the broad-brush contractual arrangements put in place by forces with core forensic services providers frequently do not include that breadth. Where forces go to seek those solutions—whether it is to the university sector to seek an academic who can also practise in a specialist area or whether it is to a specialist company—maintaining that breadth and that richness of a forensic ecosystem is one of the key challenges that we will face.

Lord Fox: To be clear, you are saying that the interactivity between the police and others tends to be on a point basis rather than a breadth of different points. Is that what you are saying?

Dr Karl Harrison: Yes, and for the most part the contracts that form the key frameworks in the relationships between police forces as commissioners of forensic work and the large forensic services providers as the completers of that work relate to a narrow but very deep stream of core forensic work, rather than to these matters on the outside.

Lord Fox: Rather than taking advantage of the breadth that might be

available.

Baroness Young of Old Scone: Professor Thompson, do all of the students who graduate in forensics get jobs? How is the supply and demand?

Professor Tim Thompson: When you look at the figures for employability after forensic science degrees, there is high employability. It is not necessarily in the fields of forensic science. What most forensic science degrees offer is a good science degree with some good applied content as well. Students will go off and work in graduate-level jobs but they will not necessarily be in the field.

Baroness Young of Old Scone: Is that an issue?

Professor Tim Thompson: There are enough high-quality graduates for the jobs on offer. If there were more jobs on offer we would have the quality graduates to fill them.

Baroness Morgan of Huyton: Following on from what Dr Harrison was saying, and I guess this will come up in our next session as well, has the relationship with commissioning changed? Was the situation better in the past or is it a status quo?

Dr Karl Harrison: I am of an age where I run the risk of being a grumpy old man about that relationship in the past. The challenges have changed. I do not think that it was ever perfect. I think that the current contractual system is essential to maintaining business as usual, but it is important to be mindful of the risk—that there needs to be a means by which that breadth of specialism can be preserved within the system as well.

Baroness Morgan of Huyton: Was there a breadth there in a different period or has this always been a problem?

Dr Karl Harrison: The breadth has always been a challenge. The breadth was there in the past and it remains to be seen how that breadth continues to find a way to function as our quality benchmarks become more overt and increase. A university practitioner of a specialist subject might work for a police force once or twice a year. If their organisation or university is suddenly required to invest in the production of standard operating procedures that would lead them towards an ISO qualification that will potentially freeze a lot of specialists out of the market.

The Chairman: Thank you. All of us forgot to declare interests. Apart from being Professor Emeritus of the University of Dundee, I have no other interests to declare.

Lord Griffiths of Fforestfach: I have no interests either. Can I come back to your answer regarding the breadth and so on? Presumably, if I am a police officer concerned with trying to resolve a particular crime, that will be my priority. To expand the whole service will, I assume, require a budgetary increase, or is that not so?

Dr Karl Harrison: Rather than expand this framework contract so that it takes up every possible, conceivable forensic discipline, what is required

is a means by which it is possible to be flexible around the edges. But if you suddenly need a forensic tattoo analyst or a forensic ornithologist, you will have that ability to reach out to somebody to provide that answer for you.

Q3 Lord Kakkar: To declare my interest, I am a Professor at University College, London and chairman of the Judicial Appointments Commission. I want to explore the robustness of the evidence base that attends the use of investigative techniques in investigation and prosecution of crimes. Can we be satisfied as citizens that that evidence base genuinely exists and, if not, where are the gaps and how are those being addressed?

Dr Karl Harrison: That question is quite general and you will probably get three rather specific answers from us from our own forensic specialisms. As an archaeologist, I tend to carry my science around with me in a bucket so I am not performing trace-evidence comparisons and I do not therefore rely upon large-scale databases or a library of potential trace materials. I rely upon long-standing principles of excavation in order to provide an interpretation. That sounds like a rather cowardly answer from my perspective but I tend not to suffer so much as some of my colleagues from the evidence-based answer.

Lord Kakkar: There is validity to the approach that you take.

Dr Karl Harrison: There is, yes.

Lord Kakkar: And in other areas of forensic science?

Professor Tim Thompson: Yes, there is. As Karl says, it is about the experience that you gain but there is also an important role that some of our academic journals play. As researchers in university we are obviously producing our research and publishing that in peer-reviewed journals. That is a mechanism by which we can provide that evidence base for other practitioners.

The Chairman: In the initial answer to my question you alluded to the fact that academics work with the private testing laboratories but presumably also with the police and judiciary. Perhaps Lord Kakkar would like to repeat the question he is asking about citizens.

Lord Kakkar: One hears from outside forensic science of moments in time when a scientific theory or a particular piece of published work is refuted. How does your particular scientific discipline deal with that, in view of the important consequences that forensic science has in the prosecution of crime? Has it happened? Are there forensic techniques that once were considered absolutely robust, which subsequent academic rigour and research has identified as not so robust?

Professor Tim Thompson: In my discipline of forensic anthropology there have been, but they have been few and far between and we tend to see incremental refinement of existing methods. Hopefully that will provide the confidence. In respect of the methods that have been discarded, my area is quite an old, traditional discipline so there tend to be relatively old methods which are replaced by newer methods. Those newer methods are based on more appropriate sample sizing and

scientific methodology, so we can have more confidence in that. Regarding our practitioners, we tend to see education and publication demonstrating that the older method needs to be replaced with a more modern method through, for example, validation studies.

Lord Kakkar: And is the academic community sufficiently robust to be able to act collectively in that fashion and transmit and transfer that development of knowledge to these non-academic participants in forensic science?

Professor Tim Thompson: There are two parts to that question. On the first part, I believe that we are. That is the basis of our scientific research. Our ability as academics to then disseminate that information to non-academics might not be perhaps as strong as talking to ourselves as academics.

The Chairman: Dr Morris, considering that digital crime is apparently on the rise, do you have a comment on that question?

Dr Sarah Morris: For us it is about the interpretation of the artefacts. In computing there is a standard definition for their purpose but not for how they are implemented. That can lead to great variations in the artefacts that you find and also what they mean concerning evidence.

Lord Fox: Sorry, I do not understand that.

Dr Sarah Morris: For example, there is a standard definition for things like a recycle bin on a computer. It is where a user deletes files but how it works underneath can vary depending on whether you are looking at a Mac or a Windows operating system. That is an understanding of an evidence base where the definition is standard but underneath we have different meanings which could result in different user activity. There is not a great understanding of the difference between their function and what the artefacts underneath represent.

Lord Fox: Does that fill us with confidence? I am confused as to whether to be excited, pleased or upset by that answer?

Dr Sarah Morris: It leads to a research-based discipline. A lot of the training is around the research and understanding of the context of the artefacts. What you will find in digital forensics is that we have very strong links between the academics and the practitioner community. The universities involved with this are very active in working with the practitioners. There is a First Forensic Forum where practitioners and academics get together and discuss results. That research base makes a difference but there are still pockets where they are working off the function and not underneath.

Lord Fox: This is rather leaping ahead and I should say that I have no relevant interest in this. Two questions. First, it seems to me in light of that answer, or from what I can make of it, that the question you ask is rather more important than what answer you get. Therefore, does the user community have sufficient expertise to ask the right question of the digital forensic person? Secondly, with the advance of digital technology, the ability to fraudulently create digital evidence is moving very quickly.

Does your part of this industry have the evidence base to manage the fraudulent creation of digital evidence?

Dr Sarah Morris: I would say there is definitely a misapprehension about digital forensics when people ask us to find information. In that channel of communication there is often a lot of work to try to work out what both sides are interested in, and that can lead to a lot of impossible requests and it can take a lot of time to try to find a workable solution. With regard to the evidence base, when people try to manipulate artefacts or obscure their data, digital forensics are now starting to look more at context. It would therefore not be just, there is a file containing a potentially indecent image, but can we tell if the user downloaded it and where they may have got it from? That context makes it very difficult to start obscuring or manipulating the data because you can see if there are breaks or anomalies in that chain.

The Chairman: What we are trying to explore with you as academics is, in simple terms, do you feel confident that the evidence that is used both in investigations and in the judiciary after any crimes that may have been committed is scientifically based and in the veracity of that science? Or is it that the academic community is quite detached from what goes on in everyday life?

Professor Tim Thompson: In my discipline I would say that there is confidence. We can be confident in the evidence base that we are presenting and have confidence in the manner in which the academics are engaging with that research. Within my discipline, I would not say that our academics are separated from what is going on in the real world, but I do think we need to be better at communicating with the end users of the research that we are doing.

Lord Fox: Following up on that and on the answer you gave to Lord Kakkar regarding the body of evidence and the confidence we can have, it strikes me that the danger is around the edges of this, where you stretch to the limits and the limitations of the particular technique. Are you confident that from your side, the science side, people understand the limitations of what they are doing; and from the user's side—the police or defence side—that they understand the limitations of these techniques? It seems that that is the point at which the courts could be misled. That is where it starts to become grey.

Professor Tim Thompson: As a discipline we do know the boundaries of our research and our evidence but I would also say, relating to your earlier question about whether we know the right questions to ask, that I do not think that is necessarily true for the end users of our research. Unless you fully understand the discipline, you do not know what questions to ask. There might be an issue there. A theme I keep coming back to is that sense of communication that we need to work on between ourselves as academics and the end users.

Q4 **Lord Kakkar:** How large would the evidence base need to be for a particular forensic scientific technique for it to be considered acceptable? Could just one paper from one group describing a technique which has

yet to be validated by others be considered appropriate to apply in the criminal justice system as evidence for prosecution of a crime, or would there need to be more? Who decides that?

Dr Karl Harrison: In my experience there would need to be more than a single research paper, partly because there is not necessarily that direct mainline link between groups of research authors and forensic practitioners taking that evidence forwards. In my experience, there would be greater validity and greater probing of a technique before it came to court.

Professor Tim Thompson: I would absolutely agree with that. One of my roles over the past few years has been editor-in-chief and associate editor of a number of forensic academic journals. One of the things I have seen through that particular role is lots of preliminary studies or early studies of new methods, or applying existing methods in new areas. I would certainly agree that one study alone is not enough, and academics need to work more on building up the number of studies to show the validity of research.

Lord Kakkar: If one were an expert witness in a medical negligence case, there are very clear guidelines on what a medical expert witness would have to do, the approach they would have to take to the evidence base available and their obligations in terms of sharing all sides of a particular argument as part of a proper evaluation of that evidence. Does the same exist when an expert academic is obliged to give forensic scientific evidence?

Dr Karl Harrison: It is not as clearly laid out as it is within medicine.

Q5 **Baroness Morgan of Huyton:** My question follows on from your communication point. What is your assessment of the level of understanding in the Criminal Justice System of the boundaries of forensic science? If you have to be able to communicate with judges, with lawyers and with juries, what are the rules of the game? What are the rules of engagement? How do you approach it and how do you stop one part of this system plucking what it wants out of the evidence that you bring forward and playing with it?

Professor Tim Thompson: That is an important question. We are now working on how to make that work and how to have honest conversations about boundaries and about what you can and cannot, should and should not use in providing evidence.

My experience is that people's understanding varies from discipline to discipline and it comes back to a point we made earlier: that some disciplines are used more routinely than others and there is a greater understanding of those than of other disciplines on the periphery of practice.

Baroness Morgan of Huyton: I should point out that I am vice-chair of King's College Council.

Q6 **Lord Hunt of Chesterton:** I am a fellow of the Royal Society and an

academic. To start at the beginning at our previous discussion—how science can be used most effectively—I experienced an interesting case at the Old Bailey when I was a technical expert witness. What I did and what various others do is ad hoc experiments for a particular case, which I think is what Dr Harrison was saying he did with his bucket. As far as I understand it, the Americans have a different approach. Other people have published quite a number of papers. They would not go out and do an ingenious experiment with a bucket to determine the case, whereas my impression is that in Britain it might be one or it might be the other and there will be a judgment taking place. In the case I was involved in I had to do all these experiments. My only point, which I think is the question, is that the prosecution's experiments were very expensive, paid for by the taxpayer and were completely wrong. The defence had some very cheap experiments done in my kitchen and in a lab, which were right, and those were the ones that won the day.

Lord Fox: Thank goodness for that.

Lord Hunt of Chesterton: You sounded, if I may say so, quite definitive, as you must be in the academic approach, but it seems that judges and lawyers take quite an empirical view in Britain and look at the judgment. Perhaps you would like to comment on that.

Professor Tim Thompson: From my perspective, I think that the research should come through that publication process. I am not going to say that that process is perfect but it does provide peer review and the opportunity to critique data and experiments that come forward. The data, especially with the move these days towards open access and presenting data as part of your publication, allows other people the opportunity to challenge and test your ideas as well.

Baroness Young of Old Scone: Could I ask a supplementary to my question when you said there was a discussion starting about what the boundaries should be? Where is that conversation happening? Who is running that conversation? Where is it located and who is involved in it?

Professor Tim Thompson: In my opinion that is part of the problem. There is a lack of consistency. There are conversations between practitioners and perhaps the place they are working directly with on an individual basis but also on an institutional basis. There are conversations that might be facilitated through the professional bodies, for example, and there are conversations as part of CPD training. There are lots of things happening.

Baroness Morgan of Huyton: It is not like the MoJ saying what this is.

The Chairman: Lord Hunt, have you finished?

Lord Hunt of Chesterton: If I may add that as a scientist, I agree with the use of background scientific knowledge. The question is the application in a particular case. There may not have been any previous study but the background is very important. My impression, however, was that in the United States there is a very dogmatic approach. Unless there has been a careful experiment on that very detailed case, they would not use that information. My point is that background science is

very important but there may well not have been any previous detailed study, and I wonder how in teaching this subject as an academic you address this dichotomy.

Professor Tim Thompson: It is challenging. We would focus on the teaching of specific methods and the strengths and weaknesses of various methods that you might use. You are right, however, to say that there are only so many different contexts in which you can demonstrate a specific method to have a strong enough understanding of those underlying methods, and perhaps that is what I mean by publications. You are publishing and demonstrating validity in certain methods, and then it would be up to the individual academic where it is applied to a unique circumstance where it has never been applied to before.

Lord Hunt of Chesterton: Does this apply to numerical computation? I think it probably does.

Dr Sarah Morris: It is a very challenging area of digital forensics because the chances are that the paper is going to be out of date because there will have been a software update or you are looking at a slightly different device. When we are doing the teaching, therefore, it has to be very research-led—that this is how we established a method on this particular piece of software on this version, but here is a technique you could use to follow through on newer versions.

The Chairman: Let me try to simplify what we are trying to explore, as it is important to get this from you. How accurate is the evidence in scientific terms presented to those who investigate the crime and those in the judiciary who then use the science to determine the veracity of the investigation? Lord Kakkar gave an example of medicine, where you get academics who do the research. Based on that research, once the robustness of the research is demonstrated, it is used by the practitioners to deliver care. If they fail to deliver that care in a proper way they might be tried in the courts, and the evidence used by the courts is the science and its practice. Does that happen in forensic science and the Criminal Justice System or are there gaps that we need to fill?

Dr Karl Harrison: It is an area that is being challenged by the current system. Previously we had a role in major criminal investigations, called the “Byford scientists”. Their role would have been as experienced forensic scientists within their own specialist area, but they would have had a breadth of experience. Effectively they would be seconded to work with a police investigation team to provide exactly that level of pathfinder advice to assist in facilitating the investigator’s access to a range of different forensic capabilities. They would also communicate to them where the science was currently at and what the strengths and weaknesses were with that science. One of the challenges that we face under the present contracted position of science is that different analytical techniques are effectively coded and priced by forensic providers. In effect, police forces are choosing from a menu rather than receiving that level of active advice.

The Chairman: Good. We are getting somewhere.

Baroness Morgan of Huyton: When did that stop?

Dr Karl Harrison: It stopped with the demise of the FSS.

Dr Sarah Morris: On a similar line, the expensive price of software means that not everybody has access to the full range of tools that they need to do a thorough job.

Lord Fox: Let me turn to this ad-hocery, which was rightly introduced by Lord Hunt when he presented the contrasting US and UK court approach: ad hoc delivery of scientific evidence versus something that needs to be more established, as in the US. What I did not hear from you was whether you thought that that was a good idea in the long run or not, and whether the US system of a more robust background to any particular piece of evidence is better than an individual scientist trading off their reputation to say, here is a piece of evidence. After all, Einstein got things wrong. He could have stood in court and had a fabulous reputation but he might have been wrong. Where we are at the moment, therefore, is that we have a scientist who can present an ad hoc piece of evidence. Do you think that is a good thing for British courts?

Dr Karl Harrison: I think it is vital for British courts to retain that flexibility in the system whereby, if we simply do not have an answer that has appeared within a peer-reviewed publication, we should somehow abandon the scientific approach to investigating it. However, coming back to Tim's comment about open-access journals and access to data, it then becomes even more important that the data behind those ad hoc experiments is robustly dealt with in the court.

Q7 **Lord Hunt of Chesterton:** How should further research funding for forensic science be justified and what should be the focus of such research? One of the points is that there is often more money on one side than the other. What I could not understand in the case I was involved in was why you could not have a discussion about the experiments that were being conducted. There were two different sets of experiments. It seems that the judge and the jury should have had a discussion about how the experiment was set up, how they analysed the data and how the data was produced. Instead of which you had completely different experiments and experimental techniques being offered to the two different parties. Do you think that is right?

Dr Karl Harrison: I agree entirely. Without wanting to conflate two of your questions, I have been commissioned by the police, by prosecuting authorities something like 160 times in my career and I have been commissioned by defence counsel three times. This reflects the level of funding that is available to challenge specialist forensic evidence. Tying in with that, if you can bring together scientific representatives from both the prosecution and defence to agree the tenets of an experiment prior to it taking place, that sounds like an eminently sensible thing to do.

Lord Hunt of Chesterton: I tabled a question in Parliament on this but the then Attorney-General did not think it was a good idea.

Lord Fox: That does not make it wrong.

Q8

Lord Mair: To declare an interest, I am a Fellow of the Royal Society and an academic at Cambridge University. Can I ask about the level of understanding of forensic science within the Criminal Justice System? You, as forensic scientists, have to get the message across to lawyers. An example lying behind my question is the whole area of what we call in electronics signal-to-noise ratio. Increasingly, forensic science is becoming more and more expert at using very minute traces—for example, for DNA or other forms of testing. At what point is it explained to the lawyers that there is a point at which the level of testing is so minute that it might not be significant? How do you get that sort of message across?

Professor Tim Thompson: That is one of our challenges at the moment. You are right that the development of our methods generally within the forensic sciences is allowing us to look at smaller and smaller samples. The methods we have available to us are becoming more and more complex and require an increased level of understanding of the underlying science as well. It is therefore becoming increasingly challenging to communicate that side of things to non-experts. It is easy to say but the solution, certainly from my experience, is about opening dialogue and having those conversations. We come back to the question earlier about understanding the right questions to ask. Unless there is a certain level of understanding of a discipline before you start—even before you start talking about the individual methods that one might be using—it is difficult to appreciate or contextualise what one might have wanted to say. I am not sure of the correct avenue for those sorts of conversations. I suspect we might have to use multiple channels to make that work. Again, talking from my experience, one of the things we have done very successfully with regard to getting across the nuance of anthropology is very short, bite-sized hands-on training and demonstrations by way of active learning for people who might want to engage with the discipline, so that they at least understand where to start with asking those challenging questions.

Dr Karl Harrison: From my perspective, I am very fortunate to practise a discipline that most juries will have some intuitive understanding of. I can talk to people, therefore, about the soils that are local to where they are—that if you dig a hole in the ground and fill it in, the texture changes. They can therefore develop a rudimentary understanding of what I do relatively quickly in a court environment. That then assists me in communicating some of the more arcane aspects of the excavation process. That comes at a cost, in that there is a challenge—that what I do does not appear very scientific to police forces. Therefore the risk is that people will conduct excavations themselves without that background and it then cannot be re-tested. Often when we talk about forensic sciences and about forensic biology, then the coal-face review and the return to exhibits, the opportunity to re-test cannot exist because I am going to destroy that graveside by excavating and recovering the victim of that crime. The onus on my level of recording and the importance of challenge of what I do by the defence is, if anything, even greater, and that that has probity within a court.

Lord Fox: I have two points. First, you talked about dialogue and the need for open channels. What are the professional associations doing here? What are they for and how professional are they, what kind of barriers are there to being members of them and how do they operate? Lord Kakkar used the analogy of the medical profession, where we understand the professional bodies and how they stand and what they are for. I do not get any sense of what you are for. Because you are crossing so many different scientific disciplines, it seems that it is a rather more disparate and less unified voice. How do you pull that together and what are the opportunities?

Professor Tim Thompson: You are right. There is an element of fragmentation, especially as you start moving towards some of these disciplines on the periphery where you might have a subject-based professional body which you engage with actively and the qualifying criteria for being members varies from professional body to professional body. You also might want to engage with the professional body for the forensic science. The Chartered Society of Forensic Sciences acts in that role. Membership for that varies. There are different levels of membership. The professional bodies are working at the moment on developing a chartered forensic practitioner status to address some of these issues. They do work as a body for bringing interest groups together in terms of the scientists and the lawyers and other elements of the Criminal Justice System. Part of the challenge, however, is that it is such a broad beast. There are so many disciplines and there are so many interests.

Lord Fox: If I happen to be a scientist in a particular area and you happen to be organising the defence of someone, I would not need to be a member of any of those associations in order to be used in court to give evidence, for example. Is that right? There is no prerequisite for anybody to be part of these bodies, signed up to whatever charter they have or anything like that.

Professor Tim Thompson: That is correct.

Dr Karl Harrison: It has become more complicated to answer in the last few years.

Professor Tim Thompson: It has. Over the last few years we have seen a recognition of that issue. The professional bodies have started to develop frameworks for accrediting practitioners in different disciplines. Different professional bodies have different mechanisms by which they do that, so there is no consistency across the different disciplines. The aim going forward would be that within the courts you would look for that accreditation. Has this particular individual been accredited? Have they been signed off as being competent within their discipline? Have they signed up to the use of the standards within their discipline? There is no requirement as yet to be accredited.

Dr Karl Harrison: From a practice perspective, Lord Fox, I see a range. If police forces phone the company to request a forensic archaeologist, some will say "Are you accredited?", and that will be one of the first points of conversation before we start to talk about the case. Some will

not ask. Some will not call the company and will actively avoid using an accredited expert in order to save money. Currently, therefore, it is a patchwork that we work with.

Q9 Lord Mair: Could I ask about research funding? Obviously it is very important for you at the universities. Can you say a little about where you get your research funding from and is there an issue in that, because your subject crosses many different disciplines, it is not so easy because it is not a question of going to one research council? Can UKRI play a role in this in its new co-ordinating role?

Professor Tim Thompson: Yes, I think it can. You are absolutely right - part of the challenge that forensic science has had is that it can be very multi-disciplinary in its approach. It has historically struggled in gaining funding that might be available through some of the funding councils, not necessarily through a specific forensic stream but because it is aligned to other disciplines. They have struggled historically therefore because, as we have said earlier, a lot of the forensic courses and research are going on in some of the less prestigious universities that have historically struggled to get funding. There has been some success more recently through bodies like The Leverhulme Trust, which has funded work. It comes back to a theme that we have spoken about already this afternoon. One of the challenges is that one of the ways of attracting research funding is by presenting a research project that is very exciting. It might be quite "blue skies" and it might look very innovative and that is entirely appropriate, but there is also a need to be able to fund perhaps more mundane but very important studies in terms of validation and so on. Those tend not to get the funding because they lack not the quality of research, but perhaps those qualities that funding councils look for in new research.

Lord Mair: Where do you get your research funding from typically?

Professor Tim Thompson: We have luck through organisations such as The Leverhulme Trust, which specifically funds multidisciplinary work. That has been very successful. Otherwise, what we tend to find in many institutions—this leads back to a problem we have with research in forensic science—is that you might end up doing lots of very small-scale projects which are cheaper to run, perhaps developed from Masters projects or PhDs, but fundamentally are quite small-scale and relatively cheap to do. That does not mean that the science is not valid but what it tends to mean is that you have a slightly piecemeal approach to research in the forensic sciences.

Lord Mair: In a perfect world, if there was an opportunity for larger funds of money being accessible to you, what would be the focus of your research? Is it possible to say that?

Professor Tim Thompson: It depends from discipline to discipline but what you do need is to provide evidence that you have had conversations with end users. There is no point doing research in the forensic sciences that is not going to benefit the Criminal Justice System; you want to engage with the police and with the lawyers in order to make sure that

the questions you are seeking to answer are valid and that the research you will do and the way that it is structured will have the meaningful impact you hope for. One of the other things we need to consider is to ensure that forensic science is taken seriously as a body of research. We are now seeing acknowledgement within the REF framework, for example, that forensic science is occurring and it notes that it might be cross-disciplinary. Again, that is a step in the right direction in providing credibility for the research that we might want to do.

The Chairman: Dr Morris, apart from your unit, how many other academic units will be involved in digital, for instance?

Dr Sarah Morris: There are a few across the country. Most of them are linked with cyber-security units and in traditional computer science departments. The larger ones are Napier, University College Dublin, Liverpool John Moores and Sunderland.

The Chairman: Cybersecurity presumably is more related to the financial industry.

Dr Sarah Morris: Cybersecurity tends to be the protection of devices and looking at how to secure them, whereas digital forensics would be after the fact, looking at what occurred. The two go very well together.

Lord Hunt of Chesterton: One of the features of modern society is that we are having more and more data collected in the streets, in shops and everywhere. You might have thought that if we were able to analyse this data we would become a safer environment but that is not obviously the case. Do you think that the amount of money that is spent on analysing signals and data is sufficient? Could we be a safer society if we had the resources to use our data? Perhaps this does not count as forensic science; this is crime prevention. Occasionally, presumably, there is a lot of crime that is observed in these data systems which you can then apply forensically. I wonder whether you would like to comment on that.

Dr Sarah Morris: It comes down to research funding again that a lot of the work done in this area will be proof-of-concept, using artificial intelligence techniques and more traditional computer science where your digital forensic analyst may not have the understanding to explain the techniques that they are applying. I think it would be good to get more research done in that area, particularly more application of traditional science techniques to digital forensics, to bring the two disciplines in line a little more.

Lord Hunt of Chesterton: Could this bring forensic science together with the wider questions of a healthier, safer environment? At the moment it is quite separate from forensic science but in a data-rich world, presumably, it could become a much more overall approach. I might even use the word holistic.

Lord Vallance of Tummel: I have no interests to declare. For information, is there not a distinction from the forensic science angle between cyber crime, which gets you involved with the dark webs and hacking, with a lot of network stuff in it, and other types of crime where the digital interest is more in finding and analysing data that may be on

devices of one kind or another? Are they taught as one thing? They seem to be quite different.

Dr Sarah Morris: We tend to teach them together, looking more at the information left on the device rather than the specific crime that would be investigated. So it is more about the end result. You would see potentially in a murder that they have used an internet browser to look up different poisons, whereas they might use the same technique for cyber crime for hacking. We look more at the software than the crime itself.

Lord Vallance of Tummel: I can see that but is there no distinction between the nature of the forensic science as it applies to network things like the dark web and so on, and the periphery of devices?

Dr Sarah Morris: Because the range of crimes that digital forensics can be applied to is so wide, we tend to focus more on what user activity might be rather than the specific types of crime.

Lord Fox: Most of that answer has come through but I just wanted to follow up on the good point raised by Lord Hunt. The Alan Turing Institute is supposedly doing a lot of what Lord Hunt was alluding to. Is there any sense of communication between the digital forensic world and The Alan Turing Institute and what it is about, because it would seem to me that there is a lot of potential in that connection?

Dr Sarah Morris: I am aware of links between the cybersecurity disciplines and The Alan Turing Institute. I am not aware of any between digital forensics and The Alan Turing Institute.

Q10 **Lord Borwick:** Dr Morris, with the growth of digital forensic matters, the sheer volume of evidence that you will be producing will perhaps swamp many cases. Do you find that lawyers, who in my opinion tend to be rather analogue sort of people—rather like politicians—are equipped to deal with this extra load of evidence that you can produce or do you think it would be better to have younger lawyers and younger jurors to cope with this? How do you deal with this problem of understanding of the evidence?

Dr Sarah Morris: I do not necessarily think that they need to be younger but there is this tendency to ask for a lot of information. As I said earlier, it can be a lot of information that is either irrelevant or impossible to gather. Big data for us is a huge problem. As you will have seen, computer hard drives are growing. The range of devices that we are asked to analyse is also growing. It can be anything from a computer to a games console to a washing machine to a car. There is this wealth of devices, each with different challenges and each with different types of information we can get and different meanings. It is about opening communication and training them that what we might be able to do with a car we may not be able to do with a washing machine.

Lord Borwick: Regarding the evidence that is given and the task to explain it to the jury, do you get any feeling that juries naturally understand this or do they nod wisely and take it on trust?

Dr Sarah Morris: In my experience, while the CSI effect of the media has been very good for showing that digital forensics is the thing, it also means that a lot of people think that they understand computer evidence and how computers work. So there is a lot of misunderstanding from the jury and a lot of presumption about how it works.

Lord Borwick: How can that be dealt with?

Dr Sarah Morris: Training on the part of the digital forensic analysts about how to present their evidence in a way that stops these misapprehensions and makes it clear, potentially describing what people may presume and then going on to showing what it actually is.

The Chairman: Is your department involved or are you personally involved in the Criminal Justice System when it comes to digital crimes?

Dr Sarah Morris: The digital forensics unit is casework proactive and has been for the last 20 years. We get involved at the moment. Due to the ISO accreditation we do more civil work than criminal because the cost of getting the accreditation was prohibitive.

Lord Fox: Where does digital forensics stop and digital stuff begin? You have a whole bunch of things like social media, which does not need a forensics person to investigate, but is part of a wider digital thing. Do you do that or does someone else do that? If someone else does it, who is it? Who trawls through Facebook and whatever else, or is that part of what the digital forensic people do even though you do not need to be forensic to get hold of it?

Dr Sarah Morris: Online and things like that would typically come under open-source intelligence. It would be on a case-by-case basis, whether that is within the remit of a digital forensic examiner or not.

Lord Fox: That would be part of the deal that you would do at the beginning of the case.

Q11 **Baroness Young of Old Scone:** I declare an interest as Chancellor of Cranfield University. We have moved from having a state provider to a market provider for forensic services, at least in England and Wales. Is that a good thing or a bad thing?

Dr Karl Harrison: It was a highly disruptive thing and the ramifications of that disruption are still being felt, and it still remains unclear where the good and the bad have fallen within that. Perhaps within core forensic disciplines in biology and DNA work there is a little more "business as usual", in the sense that that is still the core volume of material, which now passes from a police force to a private forensics provider, as it used to do to the Forensic Science Service. Perhaps there is a little less disruption there. Certainly around the edges, I would say that we see within niche disciplines an awful lot of disruption and an awful lot less clarity in how our interactions with police forces as clients move forward.

Baroness Young of Old Scone: We hear scare stories of the risks of a market approach, in terms of providers failing and providing low standards. Are these scare stories or is there a real issue with the

sustainability and quality of the market-driven providers, present company excepted?

Dr Karl Harrison: It depends on the maturity of the tender structure whereby groups of police forces or police force regions have tendered for the forensic services and gone out to the private forensic services providers to put forward bids. Where there has been a race to the bottom we have seen some vulnerability in that system. My personal opinion is that in the force regions that have more recently gone to tender, there seems to be a shift. There is a move towards more stable relationships so that the periods of the contracts are increasing, there are greater amounts of research and development strands fitted within them and there is a more holistic view of what the partnership should be between the forensic service provider and the commissioning police forces. It is, however, a very uneven picture across the country because of the autonomy that is built into the policing structure of England and Wales.

Baroness Young of Old Scone: If you were asked, would you recommend that the state-provider system came back in or not?

Dr Karl Harrison: Personally I would not because I think there is a lot of strength and vibrancy in the system that is developing. I would recommend that we continue to beat the sector towards the quality standards that are in the process of coming into place. What needs to be paired with that, which currently does not exist on the agenda, is a form of commissioning authority that effectively holds police forces to task regarding experts. Given the type of effect you are looking at, we would recommend that you have meaningful discussions with the following experts. You do not have to pay for them or commission them, but there needs to be a conversation to ensure that you are not simply passing that particular crime type under the radar.

Baroness Young of Old Scone: Do your two colleagues feel the same way or would anybody like to make a spirited bid for public sector provision?

Professor Tim Thompson: Personally, with something as important as this we need to consider whether or not it should be managed by the state. If we are to stay with the system that we have, I would agree with Karl regarding the oversights that we need but I also think that we need to think hard about market exit. When you have a market system you have to plan for providers leaving, for whatever reason that may be. I wonder, in view of the speed that everyone has had to work within the new system, whether we have thought through some of the implications of that.

Baroness Young of Old Scone: You are sitting on the fence.

Professor Tim Thompson: Yes. I personally believe that there are certain services that are for the good of society that we need to consider running centrally, in the same way that we might think about the NHS or something like that. That is a personal preference.

Baroness Young of Old Scone: How about Dr Morris?

Dr Sarah Morris: For the most part, I agree with Karl and Tim. It would be good to have that more centralised assistance for digital forensics, particularly with the new ISO accreditation that has been brought in and the knock-on effect that has had with different organisations interpreting it in different ways, so that we can get a bit more standardisation in the digital forensics process.

Lord Hunt of Chesterton: You were saying when you gave evidence earlier that you have been 30 or 40 times more often a witness for the prosecution, and one or two times for the defence. If I understand it, what you are saying is that generally there will be much more scientific evidence provided for prosecution services than for defence services. Are there any statistics for the amount of forensic research available to the defence compared to the prosecution?

Dr Karl Harrison: I am not aware of that and I have never seen any, but purely for my anecdotal casebook it would be an interesting question for The Chartered Society of Forensic Sciences.

Lord Hunt of Chesterton: A PQ will be put down on that.

The Chairman: Currently there is no evidence for that.

Dr Karl Harrison: Not that I am aware of.

Lord Hunt of Chesterton: That is incredible. Is that true in other countries as well?

Dr Karl Harrison: I suspect in continental Europe, because you have a magisterial system that is advising on the use of particular experts, that is less likely to be the case. However, speaking on behalf of niche forensic sciences, one of the challenges is that if you look at systems such as that in the Netherlands, where you do still have a state-run archaeology and anthropology service within the forensic institute, the risk is that you have a very small group of people, because how many senior reporting scientists, such as me and Tim, are you going to salary, sitting in an office waiting for these jobs to come in? The market can therefore also create the breadth that we see in this system.

Q12 **Lord Griffiths of Fforestfach:** What do you think the role of the Forensic Science Regulator should be and do you think that the powers that they have should be made statutory?

Dr Karl Harrison: The role of the regulator should be to hold forensic service providers like myself to task. By insisting upon adherence to ISO accreditation, that will improve work across the board. My concern with that is that I am extremely fortunate to have a company that could afford that process. If I am the only person who can do that, there is no benefit gained by being the last man standing because effectively, my little ecosystem will wither on the branch and forensic archaeology will be no more. Before statutory powers are passed to the regulator, therefore, a broad conversation needs to be had about what support can be put in place to ensure that a tool which is potentially a bludgeon does not see the end of the breadth that we started this session with. We do have a

tradition of forensic science that embraces all sorts of other experts. How, therefore, can we continue to work within it?

Lord Griffiths of Fforestfach: Regulation is effectively a tax on a company and if you cannot pay the tax you are not in business.

Dr Karl Harrison: That is correct. You are not in the sector.

Lord Griffiths of Fforestfach: Given that this issue is so important, is there a case for the Treasury's subsidising this activity?

Dr Karl Harrison: That would be an interesting area to explore. There is certainly a world of difference in the sort of revenue that a large forensic service provider would get from a regional police contract sending biology and DNA work to it, and the cost of ISO accreditation and the benefits that come from it compared with those specialisms. Perhaps organised through the Chartered Society of Forensic Sciences or through the various accrediting professional societies, the subsidy would be an interesting thing to explore.

Lord Fox: Is ISO accreditation the only game in town and is it appropriate? Is it perhaps a sledgehammer to crack a nut or should there be something more tailored to the forensic world than the very broad and international type of standard that ISO delivers?

Dr Karl Harrison: It is something of a sledgehammer. As a forensic archaeologist the chief ISO standard that would affect my life is 17020, which is the scene side of ISO. It is a standard that police forces across the country are currently wrestling with, trying to understand how their crisis investigation departments can function and accredit a whole range of different services at crime scenes. I have deep concerns.

Lord Hunt of Chesterton: There is no other game in town than that?

Dr Karl Harrison: No. It is a confusing market place. I am the chair of the special interest group in forensic archaeology of the Institute of Archaeology. We have an expert panel in a similar way to there being a professional panel within the Royal Anthropological Institute. As an aspirant forensic archaeologist, I can develop a casework portfolio and put it to that group and I can become accredited. Those people who are currently experts within that group meet that accreditation criteria, but ISO is going to place another hurdle within that. But for most of them, who sit within commercial archaeological units or universities, it will be a hurdle which they do not have the means to clear.

The Chairman: I am sorry but our time has run out. Thank you very much indeed for coming to help us today. It has been a most interesting session. If on reflection you think you could have said more in answer to some of the questions, please feel free to send your comments to Donna in writing or by email. That would be most welcome and it would be used as evidence. Thank you.