

# Science and Technology Committee

## Oral evidence: Diversity in STEM, HC 903

Wednesday 16 March 2022

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Members present: Greg Clark (Chair); Aaron Bell; Dawn Butler; Chris Clarkson; Dehenna Davison; Katherine Fletcher; Mark Logan; Rebecca Long Bailey; Carol Monaghan; Graham Stringer; Zarah Sultana.

Questions 104 - 196

### Witnesses

**I:** Sam Freedman, Senior Fellow at Institute for Government and Senior Adviser, Ark; Russell Hobby, CEO at Teach First; and Claudenia Williams, Assistant Principal at Kingsley Academy.

**II:** Professor Rachel Oliver FEng, Professor of Materials Science and representative at University of Cambridge and The Inclusion Group for Equity in Research and STEMM; and Professor Narender Ramnani, Professor of Neuroscience at Royal Holloway University of London.



## Examination of witnesses

Witnesses: Sam Freedman, Russel Hobby and Claudenia Williams.

Q104 **Chair:** The Committee continues its inquiry into diversity and inclusion in STEM—science, technology, engineering and maths—and I am very pleased to welcome our first panel of witnesses this morning.

Russell Hobby is chief executive of Teach First, the organisation that trains and introduces teachers into schools across the country. Sam Freedman, who joins us virtually, is senior fellow at the Institute for Government and a senior adviser to the education charity Ark. Claudenia Williams is assistant principal at the Kingsley Academy, Hounslow. I thank our witnesses for joining us this morning.

Perhaps I may start with a question to Mr Hobby. One of the themes that we have already seen in the written evidence to our inquiry and in some of our oral evidence is that one of the challenges of getting better inclusion in STEM throughout people's careers, whether that is in industry or in academia, is people getting the right education qualifications at school. Talk us through your perspective on that as chief executive of Teach First, knowing schools across the country.

**Russell Hobby:** The roots of disparities later in careers have very early starts, right down into primary school, as well as secondary school. We are sending messages to people about who is welcome, who is included, and what sort of career options are open, at a very young age.

The starting point is, I think, the teaching workforce and school leadership workforce. Those are their first role models, and if we are not attracting a diverse pool of people into teaching, they will take those messages.

We are also sending quite strong expectations in the careers advice and guidance that we give about what sorts of careers people can slot themselves into, so they are starting to make choices at a very early age. For example, for a lot of schools, A-level courses in STEM require students to do triple science for GCSE. To do that, you need to be in some of the top sets for GCSE and, straightaway, we are right down on the age profile.

I think we can spread this opportunity further by looking at the diversity of the teaching workforce, but also at what we represent in the curriculum—who we talk about in making scientific discoveries, engineering successes and so on.

Q105 **Chair:** Thank you. We shall go into that in a bit more detail, but Teach First has teachers covering all disciplines. What has been your experience of recruiting STEM teachers?

**Russell Hobby:** About 43% of our trainees every year are STEM trainees—it goes up and down—which is a good chunk, and that is part of what Teach First is for—



Q106 **Chair:** How does that compare to the teaching profile in schools?

**Russell Hobby:** I am not quite sure on that. What I think it does compare to is the teaching profile in disadvantaged schools, because our job is to place people into schools serving lower-income communities, which are much less likely to get people who have degree-level specialisms in the science subjects. I think it is higher than that as well.

The challenge that we face is that we are competing with employers across the marketplace. It is the job of Teach First to attract people who might go into other career routes. The salaries, career prospects and opportunities for people with STEM qualifications are enormous. If we do not get some of them to divert their career plans from the big tech companies and go into teaching, we will not have another generation of graduates who can fulfil that. We do need to make sure that the prestige of the teaching profession and the starting salaries are at least competitive with other options.

Q107 **Chair:** Thank you. Claudenia Williams, you are a practitioner and you have also come through the system. Would you reflect on your experiences both as an education professional and as a student?

**Claudia Williams:** I have to say that I would not be teaching if it were not for Teach First. It exposed me to the opportunity to be able to study for my teaching profession straight after a degree.

Thinking about my own context, I simply would not have been able to afford to have done a PGCE by myself. A barrier is funding. Teach First appealed to me because of the leadership qualities that I was able to develop.

Initially, I was thinking about going into the corporate world, and if I think more widely about my colleagues and friends at university, money is a barrier. If you are coming from a disadvantaged background and you are talking about money to be able to get a degree, it needs to pay off. Thinking about my students now, who have this decision in front of them, student loans are a lot higher now. Taking into account that lots of these students have other options, such as apprenticeships into the corporate world, we have to ensure that there are equal opportunities for them to be able to study STEM subjects.

At the moment, I would say that it is important that they can see themselves represented in the classroom. Thinking of myself both as a teacher and as a student, I have to say that it is still not as diverse as it could be. I don't think that our schools yet represent the children in our buildings. In order for us to get there, we have to pay attention to what our students are studying. We also have to pay attention to how we are recruiting students or teachers from lower-income backgrounds when there are other competitive options. These are things that we should be considering.

Q108 **Chair:** Thank you. Russell Hobby mentioned the choice of subjects at



school. Often, people who could have a career in STEM—in the corporate or academic world—cannot because they have not chosen the right subjects at GCSE or A-level. What is your experience as an assistant principal in advising your students about the importance of choosing early the subjects that might be necessary later?

**Claudenia Williams:** This is where role models come in. Really early on, some students will have access to universities, or have parents who have gone to university, so they can make informed decisions about what they need to go on to do.

My school has a lot of students who come from backgrounds where their parents would not have gone to university, so they might not have a full understanding of what it means to study a STEM subject or know which options to pick as early as year 9 to be able to progress. It is really important to give both parents and students a good understanding of what that means but also expose them to those opportunities.

For us, that has been quite a barrier—getting students into universities so that they can see what this looks like. They need to be able to see themselves in these prestigious universities, studying these courses. I studied a BSc. I was one of three black people on my course. That was a shock to the system, so being able to prepare students for what that really looks like in real terms—recognising that it is possible, and having teachers championing them to do that—is important. It is about ensuring that students have the options to have access to role models who are in STEM and look like them, and that parents have the ability to support their students—and we support families where that is not the case, and when they do not come from that background and have not been to university. That is important.

Q109 **Chair:** When you were a student, making choices and deciding where to go to university, do you remember what was going through your mind and what impelled you to take the route that you did, despite the fact that, when you got there, you found that you were one of the under-represented people?

**Claudenia Williams:** I think I had a unique experience. I had got on to a leadership course because my GCSEs were one of the best in the school. That sounds really arrogant.

Q110 **Chair:** No, you should be proud.

**Claudenia Williams:** I had been put forward by my head for a course that was for under-represented people from particular backgrounds, such as those who had free school meals or maintenance allowance, so I got help at A-levels during sixth form. Because of my grades, I had access to this course.

Q111 **Chair:** What was the course?



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**Claudenia Williams:** I cannot remember the name of the particular programme—I can get back to you on that—but it was essentially aimed at students who were academically highly achieving but came from a lower socioeconomic background, so I was exposed to lawyers for the first time. I got to be an intern in a magic circle firm.

For me, I had no idea that this world even existed. Both my dad and my mum had come from Jamaica, and my mum had learned to read at the same time as me, at primary school.

It opened up a door. This is what I mean in terms of how important it is to have representation. Some of our students simply do not know that these opportunities exist, and they have to be physically there to see them. So, going on that experience made me think, “I’m going to be a lawyer,” and I fixed my mind on being a lawyer. I cannot remember her name now, but my mentor on the scheme had such an impact on me. She had gone to Oxford. She said, “You have what it takes to go to Oxford; you have what it means to be there.”

I didn’t apply for Oxford because I didn’t have the confidence to do so, but what she left with me was that I could go on, and I should be aiming ambitiously to do this. I decided to study science because I had always done well in science but with a view to going into law and to convert. My experience was a bit different, but it does still highlight that students at every level need champions, and it does definitely highlight that these opportunities make a difference. I do not think I would be here, in a senior role in a school leading change, had it not been for the fact that, when I was 16, somebody opened that door for me, and showed me that university was a real option. It was something I had read about and heard about but it was very mysterious. Having people tangibly there, making it real, for somebody like me, coming from my background, meant that I pursued the idea. It allowed me to push on despite the barriers that I faced because of my protected characteristics.

**Chair:** That is a wonderful story and wonderful evidence that has a lot we can draw on when we make recommendations so that what you managed to achieve can be made available to more people.

Q112 **Aaron Bell:** I would like to ask a question of Mr Freedman about the overall shortages in the workforce. Is it correct to say that the shortage in STEM subjects is more acute than in other subjects? If that is the case, why is it?

**Sam Freedman:** Yes, that is correct, and it has been the case for a very long time. We have had consistent shortages, particularly in physics, design and computing, for many years. I cannot remember a year in which targets were met in any of those subjects. Last year, only 22% of the physics targets were hit, so we were able to recruit, as a system, just over a fifth of the number of physics teachers that we believe that we need. Maths does better, but it is still below the target level.



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It is a very long-lasting problem and is driven by a number of factors. The first, as Russell was saying, is salary differences. You can earn a lot more as a graduate with a STEM degree.

It is also driven by the fact that not many people have STEM degrees, so, at this point, even if we recruited two thirds of everyone doing a physics degree into teaching we would only just hit the target. There is not a very big pool and a very big number that you are trying to reach.

Salary and just the number of people doing the degrees are the main problems, and of course that becomes self-fulfilling because if you cannot get the teachers, fewer people will study the subjects to a level where they are comfortable doing a degree. We are in a bit of a vicious circle when it comes to recruitment, particularly for physics, design and computing.

Q113 **Aaron Bell:** What are the implications for diversity and inclusion? Is that more acute in lower socioeconomic areas?

**Sam Freedman:** Yes. I think that it is true that, generally speaking, it is harder to recruit in more disadvantaged parts of the country. You need to separate out areas that have higher rates of free school meals, such as London, where recruitment is, relatively speaking, a bit easier, although still hard, and areas of the country that, however we describe it, are left behind, have large numbers of white working-class children, where it is extremely difficult to recruit because there are not large graduate populations living in those areas. That is why the Government have attempted, in various different ways over the last few years, to give additional incentives for people to go to work in those schools. But we are talking a few thousand pounds, which probably is not enough to encourage the demographic shift that you would need to make that work.

Q114 **Aaron Bell:** That was what I was going to come to. The Government have had a number of schemes and pilots—bursaries, the early-career payment pilot, the student loan reimbursement pilot. In what you have just said, you suggested that those have not been sufficient. I believe that the current state of play is that the Government intend to raise starting salaries to £30,000 and on top of that a boost of up to £3,000 tax free for maths, physics, chemistry and computing. Could you give me an assessment of what the Government have tried so far and of how well any of those pilots have worked, and also say whether you think that the proposals as they are at the moment will work?

**Sam Freedman:** So, we have seen, as you said, various schemes over the years, and none of them has been properly evaluated in the way that I would want them to be. I think that it is fair to say that the amounts of money that we are talking about are not enough to get people to move to different parts of the country for a long time, which is their objective. My view, over 10 years of working in this kind of space, is that you cannot really do this by paying people to move around the country; you can actually do it only by building deep roots in the area and training people



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to teach where they are happy to live in the first place. That is going to have much more chance of success, but it is also more time-consuming and more difficult.

Raising the starting salary is a positive thing. Clearly, it will have less effect than when the Conservative manifesto initially promised it, because inflation is so high, but it is still going to be a positive.

I am a bit worried that the way it is being paid for effectively is by suppressing salaries further up the pay scale. I am a bit worried about the impact that that will have on retention. We need to recruit, but obviously we need to retain teachers as well, so I think we need to look at both the positives but also the risks that it is putting on more experienced teachers.

Q115 **Aaron Bell:** Thank you. I think you are absolutely right about the issue of left-behind areas, or red wall, or whatever you want to call it. That is a real challenge because, fundamentally, we do not have the graduate population in those areas.

Claudenia, what effects have you seen on pupils as a result of workforce shortages, particularly with STEM teachers?

**Claudenia Williams:** I have worked in a number of Teach First schools now, and science and maths teachers are really hard to recruit. It means that there are pupils in a number of schools who do not have a specialist sitting in front of them. That is devastating. It is not good enough. If we are talking about improving the pipeline of STEM and really having an impact, we need to have students who have access to high-quality teachers and a high-quality curriculum. The main impact will be on student outcomes when they are either having a supply teacher in front of them, or another teacher who does not have the same level of specialism, who cannot really bring the depth of knowledge that students need in order to prepare for an A-level or a degree in a STEM subject. That is probably the most significant area.

Q116 **Aaron Bell:** Presumably, pupils will just choose not to study those subjects.

**Claudenia Williams:** No, not if that has been their experience, or, if they do choose to study that, do they have the depth of knowledge at key stage 3 to build on to key stage 4 to have a chance of getting the grades that they need to get into a top university? The impact is longer term. We do need specialist teachers in STEM subjects in front of our students in order for them to make the progress that they need to.

Q117 **Aaron Bell:** You said that you have taught at a number of Teach First schools. Have they all been in the London area, or have you been elsewhere?

**Claudenia Williams:** I have taught in London and in Essex.

Q118 **Aaron Bell:** And have you noticed differences between the different



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areas?

**Claudenia Williams:** Yes, I would say so. When I taught in the inner-London area, I could freely give my students a revision guide. When I taught in Essex, I was going to my friends in Canary Wharf, using their printing resources at the weekend, so that my students had revision resources because I was limited to £5 for six weeks in printing.

Q119 **Aaron Bell:** Whereabouts in Essex was this?

**Claudenia Williams:** In Thurrock. We are talking about, in terms of recruitment, having to think about incentives for trainees. If they go 5 miles down the line, they are in outer London, and the pay scale is completely different, so we are losing teachers because of geography and pay. Also, the funding is different. From my experience, both teaching and leading, not too far away, that been a significant impact. I have seen it.

Q120 **Aaron Bell:** Thurrock shares quite a few characteristics with some of the places that Sam was talking about.

**Claudenia Williams:** Yes.

**Chair:** Before I go to Rebecca Long Bailey, I think Katherine Fletcher wants to come in.

Q121 **Katherine Fletcher:** Thank you, Chair. This is really interesting evidence.

I have a lot of friends who are in the teaching profession up in north-west England, and to cover some of the STEM subjects they are being asked to apply their technical expertise to subjects in years 7, 8 and 9 especially, so I will receive calls—I will not name them, otherwise it would be too obvious. I would be interested in all your brief perspectives on whether that is sustainable, because, to be fair, I would say that the inside of a daffodil is communicable by a quality teacher—you do not need a specialism in it. Is that a way to cover it, or is that just compounding the problem?

**Claudenia Williams:** I disagree. I think that key stage 3 is a real opportunity for students to build significant depth and knowledge. I think that the work that we are doing and the shift of focus in the curriculum points to that. We do need subject specialists who can go into depth and detail so that students can build on that knowledge. What we know about learning and how it works means that we need to pay attention to early years, probably even before key stage 3, so I still don't think it is good enough not to have a specialist teacher in front of students. They deserve to have that.

Q122 **Katherine Fletcher:** Understood. Is it possible to cover some of the gaps that can inspire the next generation with non-specialist teachers, Russell?



**Russell Hobby:** On a temporary basis, teachers can step in to help, and do so on a regular basis, but if you want people to choose careers in these areas, or further education, what you also want is someone who clearly loves the subject they are teaching and thinks that physics is the most amazing thing in the world. I think it is the teacher's inspiration that steers young people in particular directions. I think they choose A-levels as much on the basis of the teacher who is going to teach them as on the subject itself. People from all sorts of backgrounds can love physics: you do not have a physics degree, but it is more likely that you will on that basis. I don't think it is sustainable long term.

**Chair:** Thank you, Katherine. I see Carol Monaghan nodding vigorously in assent to the passion for physics.

**Katherine Fletcher:** I think it is important to get it on the record.

**Carol Monaghan:** I do not know whether it is in response to loving physics or the point about the teaching of it.

Q123 **Chair:** Carol is a former teacher of physics. I think that Sam Freedman wanted to come in to make a point. Is that right, Sam?

**Sam Freedman:** Yes. I just wanted to say that, if you are looking at key stage 3 and key stage 4, we do not have a shortage of biology teachers. We have enough biology teachers. We only have a small shortage in chemistry, but the problem is physics. The majority of physics below GCSE level is not taught by physicists. It is already taught by people who have specialisms either in other sciences or just did a science A-level, so we are beyond the stage of thinking, "Oh maybe we can use people who do not have physics to teach physics"—that is already happening for most children in the country pre-A-level.

Q124 **Rebecca Long Bailey:** If you could prioritise a couple of actions to redress STEM teaching workforce shortages and diversity within the STEM teaching profession, what would they be, starting with Sam?

**Sam Freedman:** The first thing I would do, going back to the point that Claudenia made about the cost of training, is scrap the need to get a loan to do a PGCE, or to do any training. It is quite mad that we force people to get a loan to do a PGCE because, apart from anything else, there is no financial benefit to the Treasury. They are never paid back. Your average teacher will never earn enough to pay back both an undergraduate loan and a post-graduate loan, so there is no financial benefit to the Government from demanding that people take out a loan, yet it still puts people off doing a PGCE—it is doubly pointless. My understanding is that the Treasury has refused repeatedly to countenance dropping it, on the grounds that it would create precedents for other careers and other student loans reductions. But that is just a very obvious thing that you could do, with very little cost, which would make it a lot more attractive for people to go into teaching and, obviously, from more under-represented backgrounds in particular. That is No. 1.



I think the starting salary changes are good, but I would want to look at them in the light of inflation. The original aim of going to £30,000 when inflation was running at 1% or 2% was appropriately ambitious for the scale of the problem. With inflation running at 7%, 8%, it is a lot less ambitious, so we should look again at whether that could be even higher and whether the salary scale further up can be looked at as well.

Finally, I would have another look at bursaries and how they are structured. There are already quite substantial bursaries for going into STEM teaching, but my understanding is that they are still primarily paid as a one-off at the start of the course. If you end up doing the training but not going into teaching or stay in teaching for only a year or two, you still have the big financial bursary, but you have not actually taught very much. Whether there is a way to spread it out more so that you get bursts of that for staying in teaching and you get rewarded for staying in teaching with additional financial payments down the line would be another thing to look at.

Q125 **Rebecca Long Bailey:** Thank you. Claudenia, the same question?

**Claudenia Williams:** I am probably thinking of this more from a leadership perspective and thinking of my own career progression and that of colleagues. One recommendation I would put forward would be for bespoke support for under-represented groups. There can be particular challenges. If we look, for example, at leadership, we know that we are more likely to find someone from an ethnic minority background being directed to the pastoral route rather than the academic. When we are talking about somebody making decisions about the curriculum—what is taught, sequencing, and things like this, or even career progression—it is important that there are opportunities for teachers to have access to training and other support.

I think that is really important, especially thinking about the progression into leadership, or even headship. We see significant under-representation of people from ethnic minority backgrounds. There are challenges that come with entering schools that do not have that representation, so I think we need to spend some time looking at those barriers so that we can put sufficient support in place. If we are saying that we want to have greater diversity in our schools in STEM, we need to ensure that these teachers stay in the profession, that they have the support to stay in that profession, and that it feels like a safe place to be and to grow, knowing that they can hold those roles and lead schools and are supported to do so.

Q126 **Rebecca Long Bailey:** Russell, what do you think?

**Russell Hobby:** One low-cost measure would be to look at representation in elements of the national curriculum as well. I do not think we need a change to the national curriculum itself, and stability there would be very valuable, but we could create resources that, for example, allowed people to see themselves in scientific discoveries, in the



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stories of mathematics and engineering, and so on. There are schools working on this already, so we could take those resources and make them more widely available.

Q127 **Chair:** Unpack that a bit and explain what you mean by “see themselves in scientific discoveries”.

**Russell Hobby:** For example, in elements of the science curriculum, no female scientists are referenced. It is possible to learn that as well. Very simply, we could steer that and create resources that show some of the work of female scientists. One could find that throughout the curriculum, and it does not need major change to the specifications. The same is true for what we put in the exam spec.

I also think that we should think about something that was touched on earlier, the other end of the pipeline—retention. It is the case that in schools serving more disadvantaged communities, the attrition rates of teachers are much higher. You are more likely to find experienced and specialised teachers gradually gravitating towards more affluent parts of the country. Clearly, the recruitment challenge becomes easier when you are not losing as many teachers at the end of that pipeline. We can do that: when we look at these schools in disadvantaged communities, there are high levels of scrutiny and workload, and if we steered the funding of schools more towards those with the greatest challenges they would be able to have higher staffing levels, lower contact ratios and so on, and those careers would be more sustainable and attractive. I also think Claudenia’s point around leadership progression would add to retention possibilities.

Q128 **Rebecca Long Bailey:** Thank you. To follow up, Russell, do you think there is a direct correlation between teaching workforce diversity and the diversity of pupils who go on to pursue STEM subjects at university or who enter the STEM workforce?

**Russell Hobby:** Anecdotally, yes. I do not have the data on it but, as we have seen from Claudenia’s story as well, when people see role models, that encourages them—they learn that careers are open to them and they are welcome in those sorts of communities. I do not think it would be too hard to look at the data and at the composition of school workforce in different areas and progression on to different subject routes, so that is worth a look, I think.

Q129 **Rebecca Long Bailey:** Thank you. One final question for Claudenia. Your experience seems very similar to that of many of my friends in Salford, who ended up pursuing their dreams at university by following a scheme called “the gifted and talented”, where they were identified at school. Sadly, many of these individuals were told when they were at school that they would not pass their GCSEs but, just by chance, there was a gifted and talented specialist in the school who identified them as exceptionally bright. One of them is my friend who is now doing a PhD at Cambridge. Are there different ways to assess an individual’s intellect at school that



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would surpass the barriers that many children are facing at the moment, from your own experiences?

**Claudenia Williams:** That is such a valid point to raise. I think it is a little bit about unconscious bias. I had a similar experience; I was predicted to have Cs and Bs and I could not understand why. I had a big point to prove that that was not me. I think my teachers just put me into a box, and that can be true for so many students. We just had a teacher assessing grades. We had to look carefully at ourselves as to why we were assigning grades to students.

Are there ways we can assess intelligence? There probably are, but it is more about aspirations and ensuring that in every school children have access to leaders and teachers who do not put limits on them and that there is equity. For me, the curriculum will always be the equaliser. If we had standards that ensured schools were held to account in these ways, it would not matter whether you went to a school in Salford, Manchester or London. If schools are being held to account, students may be less likely to slip through the net. For me, it is about aspirations and every teacher having the highest expectations for every child independent of their starting point or background. That is probably where we are going to have impact and see change.

Q130 **Chris Clarkson:** I want to talk about possible solutions to tackle some of the problems we have identified. Sam, how much you think this Government and previous ones have considered diversity as part of their education reforms? Do you think it is something to pay lip service to, or is it baked into the model?

**Sam Freedman:** That is a good question. I do not think that it has been the particular focus of any education reform programme that I am aware of over the past 20 years or so. It is mentioned in speeches and so on, but it has not been a major part of the thinking of the various teacher training programmes and reforms over the past couple of decades.

I want to make one quick point on correlation. There is not much of a correlation between subject take-up and workforce diversity. For instance, Indian, Chinese and Bangladeshi people are all under-represented in the teacher workforce, but young people from those backgrounds are more likely to do STEM subjects. We need to be careful not to be overly drawn into assuming there is a direct relationship here, but there are clearly some more complex relationships, such as the type Claudenia is talking about, but, to your question, I do not think it has been a feature of government reform.

Q131 **Chris Clarkson:** Claudenia, as an on-the-ground teacher—I suspect I know part of the answer, because my mum is a teacher, too—what is the experience of teachers when dealing with education reforms? Do you think they are done with you or to you?



**Claudenia Williams:** I think it is challenging. As teachers, we will always want to do what is best for the students in front of us, so it is challenging. That is probably the best answer I can give.

Q132 **Chris Clarkson:** Do you think there is any merit in involving more of the profession in that dialogue on reforming education—things like greater representation and talking to people who are experiencing what is happening on the ground rather than Whitehall deciding what diversity looks like?

**Claudenia Williams:** That is absolutely what has to happen; otherwise, we have the implementation of policy that can do more harm than good. If we are not in dialogue with teachers and school leaders who are on the ground and understand the nuances of what it means to teach in a specific community, we do not know the impact of this. Any policy change has to be done in dialogue with those who will be carrying it out or enacting it in a school context.

Q133 **Chris Clarkson:** Russell, would you say part of the problem is that there is a consensus on the inadequate level of diversity but no consensus on how to tackle it?

**Russell Hobby:** I think the lack of consensus is on the priority of tackling it and the fact that the methods we would use are difficult, expensive and long term in their effects. We need to work on this for 10 or 20 years to make a difference and spend money on it, and on whether there is a consensus on where we should spend our money when times are tight. That is probably the barrier rather than whether we should do it one way or another way.

To build on Claudenia's point, the trouble with education reform and the profession is that sometimes you need to do things to the system; you need to make difficult decisions on that, but the volume of change, with teachers constantly chopping and changing what they are doing in response to initiatives dreamt up at the centre, is probably even more significant. If we could agree on a couple of big priorities for the system that we stuck to for a long period of time, focusing on getting better and better, you would get the consensus and engagement of the profession. They could develop the expertise and move on, but there is constant change of new ideas. Therefore, a period of stability and a couple of big, clear priorities that we all share would be very powerful.

Q134 **Chris Clarkson:** More of a laser approach than a scattergun approach?

**Russell Hobby:** Yes.

Q135 **Chris Clarkson:** Claudenia, do you have anything to add to that?

**Claudenia Williams:** I agree. Alongside that, it is ensuring that school leaders have the resources and capacity to carry out the change. For example, if we are looking at reviewing the curriculum, especially in the context of diversity in STEM, do school leaders and those leading those



subjects have the knowledge and resources to carry that out, taking into account the rest of their workload? It is about making change as easy to implement as possible. Part of it is equipping leaders with the knowledge so they can do the work as well.

Q136 **Chris Clarkson:** Sam, is there anything you would like to add?

**Sam Freedman:** The only point is that, if we are to focus on diversity in the workforce, the real place to do so would be in leadership. The workforce generally is not massively unrepresentative of the population as a whole, but leadership really is. There have been some attempts at initiatives in that space—nothing particularly stark—but, on Russell's point about prioritisation, that is where I would prioritise if I was to focus on this issue.

Q137 **Chris Clarkson:** Claudenia, I want to pick up what you said about role models. In challenging stereotypes, do you think there is a barrier? This goes back to what Russell said about people seeing themselves in the curriculum. Do you think there is value in ensuring that there are more accessible role models? With no disrespect to my hon. Friend from Glasgow, when I think about a physicist I have in mind a middle-aged white man in a lab coat, but physicists look like the rest of society. I am trying to think of the best way to crystallise this. Do you think there is a way of introducing more people to the idea that they can be a physicist, chemist or mathematician? In your mind, what is the best way to give people access to that route, especially if there are very few people from that socioeconomic, ethnic or gender background? What is the best way to give them access to it?

**Claudenia Williams:** I think that in part it is about seeing themselves in the curriculum, not just having an opportunity to read about it for pleasure but being able to study themselves and understand the contributions of people from around the world to STEM. That could be quite significant.

I think there is something in mentorship—being able to go into universities to see what it looks like, even if it is not necessarily somebody from an ethnic minority background. Even getting on to the campus of a top university is aspirational for our students. That could also have impact, but it is utilised really well where schools bring back alumni who have gone on to study STEM or other subjects to share their stories and experiences. That is also very valuable.

Q138 **Chris Clarkson:** Russell, Teach First announced a partnership with Lewis Hamilton's Mission 44 in October last year. Can you give us an update on how that is going?

**Russell Hobby:** That is a good example on a national scale that we can have people with high profiles involved in things that young people may find exciting. Formula 1 rests on a massive amount of engineering and science behind it. Almost every interesting part of our lives has some connection to it in some way. We have signed up with the Lewis Hamilton



Foundation. We are trying to recruit 150 black STEM teachers as part of our cohort over the next couple of years, and hopefully this will add to that, but there is also the story behind that and how science and technology get involved in various different parts of our lives, which I think is important.

Q139 **Chris Clarkson:** How is it going so far?

**Russell Hobby:** It is going okay so far. The cohort is looking reasonably diverse this year.

Q140 **Dehenna Davison:** Russell, when talking about changes to teaching you referred to the volume of change. It is incremental, iffy and constant. Do you think it is time to set aside those incremental changes and have a bold and more radical vision behind which the whole workforce can unite to take forward improvements in diversity?

**Russell Hobby:** Yes, given the scale of the challenge we face, but it needs to be done in the knowledge that this has elements of controversy—we need to persuade and bring people together around this. It will take a long time to achieve, but tinkering at the margins with some of this will not get that level of results.

We often look to Government to lead on this. I do not think we need to do that necessarily in the education system. It is helpful if the Government are behind it, but we have delegated lots of powers and autonomy to individual schools and school trusts. It is therefore for a large, multi-academy trust to say, "This matters to us and we're going to do it regardless of the national priorities, and this is how we are going to do it." I think some of them are doing so. Given that the Government have many competing priorities, we should also look to people in the profession who are already driving this and see how bold some of their visions are.

Q141 **Dehenna Davison:** If I were to set you the challenge that you have 20 years to improve diversity and we need a bold vision now, what would be some of the key ideas you would be looking at?

**Russell Hobby:** Starting with the more straightforward end, let us have a look at the resources we are using to teach the curriculum in these areas. Can people see themselves within those elements? Are we representing the truly diverse achievements?

Q142 **Dehenna Davison:** That is about the curriculum.

**Russell Hobby:** Yes. That would be one part of it.

I would look at the funding formulas we use in how we fund schools. I would divert more of our resources to those schools serving more disadvantaged communities so they can create a workforce that is sustainable and can attract the best talent across the country to those schools. We need our best teachers in the schools with the biggest



challenges as well. I would gradually steer the funding system across to that.

I would look at our recruitment practices and procedures. There are some things we can borrow from parts of the civil service and other corporate schemes about de-biasing recruitment and making that as open as possible.

On Claudenia's point, I would invest in leadership development and additional interventions for those coming from under-represented backgrounds to make sure they can move through to their careers. Once we have senior leaders in post, as well as headteachers, they will be taking that baton and making their schools and trusts the diverse places that we want to see.

Q143 **Dehenna Davison:** Claudenia, do you agree with the steps that Russell set out? Is there anything you would add?

**Claudenia Williams:** To build on Russell's last point on specific development for those under-represented groups, that is really key. Behind the data are real life stories of people who have had a difficult time in education. For example, I sat in interview for a senior role and was questioned about my view on black history, for example, being the only colleague to have that question directed at me. I was further probed about whether it had any relevance to society today. I was told that people from my background had made no significant contributions to education.

That just puts into context some of the experiences that colleagues who look like me have had. The challenges are great. If I am to go on and lead a school I need to know that I will be supported in that, independent of what I look like.

I say that just to frame the types of barriers we are facing. If we want education to continue to be diverse and sustainable for people from under-represented groups, it is important that something is done quite urgently; otherwise, we will see attrition rates continue to rise.

Q144 **Dehenna Davison:** That is really powerful. It is quite shocking to hear about the questions you faced at interview compared with others. Thank you for sharing that.

Sam, I want to talk about financial incentives. You have touched on it a little bit already, but I have a broad question. How effective do you think financial incentives are on the scale that we have seen them being implemented by Government so far? Do you think that further financial incentives could be effective?

**Sam Freedman:** We know that bursaries are very effective in attracting people into the profession. The most important thing you can do in getting new teachers and increasing diversity is reducing financial barriers to entry. For STEM, we have done that in a way. I think that we



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could go further. I mentioned dropping student loans for PGCE, but bursaries are already pretty attractive. I am not sure we can go much further with bursaries in their current form. We could look at how we could use them more to help retain teachers by giving additional payments down the line, but we are probably reaching the limit of what pure financial incentives right up front to come into teaching can do for STEM specifically.

**Q145 Dehenna Davison:** If we were looking at retention payments down the line, what structures do you think they should have?

**Sam Freedman:** I like evidence, so I would try a bunch of different things in different parts of the country and see what worked. You could provide an annual retention bonus; you could do it at five years or 10 years; we could play around with different levels, but there is very little data and good research on workforce. One thing we do know is that, like every profession, teachers follow financial incentives. Economic incentives do work; they just need to be big enough to compensate for other factors, which is why paying people small amounts to move to a different part of the country tends not to work. I think that testing different alternatives to the model we have would definitely be worth doing.

**Q146 Dehenna Davison:** Claudenia, you will have loads of teacher friends with whom you work. How effective do you think those financial incentives are, looking particularly at teachers who are asked to move to areas that perhaps are tougher to teach in? Do you think those financial incentives do work to encourage people to do that?

**Claudenia Williams:** It depends. We have to look at a number of things—for example, challenges in communities. Will those teachers feel safe to work in certain areas based on their race, for example? For my friends and colleagues I have worked with, it is more about opportunities for progression, not just about short-term gain. Most people do not join teaching for the salary. It really is about having an impact. To have an impact you need to be in leadership, and for that doors need to be open to you, or you need a champion for you to get there so you can make decisions at a whole-school level that have an impact on every child and teacher in the building.

For me, it is not so much about the salary but progression and fair access to that. Colleagues need to know they will be valued and there is a pathway. I guess we are talking about the pipeline of teaching. If they desire to be headteacher and make change in a community with families, which is what I believe most teachers want, we need to consider how to make that more feasible and sustainable.

**Q147 Dehenna Davison:** Sam, when we are talking about policy interventions to improve diversity in STEM in the teaching workforce, what timeframe should we use to analyse those interventions?

**Sam Freedman:** It is a good question. It depends on the intervention. You tend to be able to monitor financial interventions pretty quickly



because they should have an immediate effect. If you are talking about more systemic interventions around role models and the curriculum, you would expect them to take place over the longer term.

I want to make one quick point on Claudenia's important point about leadership opportunities. One thing none of us has mentioned yet is governance. We do not have any data on this, but I will make an informed guess that governors are wildly unrepresentative compared with the national population—much more so than the teaching workforce. They recruit and choose headteachers. I have a lot of anecdotal evidence about them effectively deciding they will choose the middle-aged white guy because that is what they think a headteacher looks like.

On Claudenia's point about creating opportunity for leadership, you also need to think about diversity in governance because they are the people who ultimately select the headteacher who then selects the other senior and middle leaders.

**Q148 Dehenna Davison:** That is a crucial point and one that had not crossed my mind.

Russell, how long will it take to fix this? We are not talking about 12 months, are we?

**Russell Hobby:** No, we are not. There are nearly 500,000 teachers in the country. If we work on this through recruitment only and recruit to the profession about 10% a year, you can see how long it would take to change it. We should begin to do that straightaway, and some things have been going on for a while. If we want to do this, we have to work with the existing teaching population and help to equip them for this. You have to keep the people that you have as much as you can and look at the differential rates at which people leave the profession.

To build on some of the earlier points, most graduates envisage their first career to be in a city, particularly those with STEM skills. Often, it is London, but there are many other cities they would be very happy to work in. They do not envisage working in rural, coastal or some of the industrial towns of the country, but there are phases of your life where you want something different from where you live and what your career has been. We sometimes think about moving graduates around the country. How do we get those? Are there incentives for mid-career professionals, for example, who want to move out of the city and have a different place to raise their own families? They want more affordable housing, more space or whatever it might be.

There are many benefits across the whole country. We need to look at how people's careers change and how you create leadership development opportunities that would move someone out of London, for example. It is not a silver bullet for that, but it might have more traction than just moving graduates around the country.

**Q149 Chair:** May I ask a follow-up question? Sam, you said you thought we



had reached the limit of incremental impacts from bursaries. Why is that? Explain what is behind that remark.

**Sam Freedman:** You are already offering a starting bursary of £25,000 for physicists and chemists to come into the profession. I fear that if you go much beyond that you are creating an incentive to come in just to get the bursary. Imagine you gave a £75,000 bursary for teaching physics. It would be pretty attractive to train for a year, get your £75,000 and then never teach. I worry that you are almost starting to create perverse incentives beyond the point we are at, but I do think we can play around with the structure of how those bursaries work—try out retention payments and look at the cost of student loans. There are other things we can do, but for the core starting bursary it is hard to see the benefit of going beyond what is already a very generous level.

Q150 **Chair:** To take the case in point, suppose you did pay £75,000, but it was repayable over 10 years if you left before the end of the period.

**Sam Freedman:** If you switched it to retention, you could have more overall as a package, but you have to spread it further than is currently the case.

Q151 **Carol Monaghan:** I want to challenge the stereotype my colleague described of a physics teacher in a white coat. He will, of course, know that it is chemistry and biology teachers who will be wearing white coats, not physics teachers.

Claudenia, your evidence has been really interesting, and much of it has been personal. I was a physics teacher and I know the difference it made to girls in my class to have a female physics teacher. Can you explain a bit more how pupils from ethnically diverse backgrounds respond to you coming from a BME background, and why that is important?

**Claudenia Williams:** I think it is both. I have taught in Essex, which is a very different demographic; I have taught in schools where I have had predominantly white working-class students. I think it is important for all of those students to see someone like me in front of them. They are learning: I love teaching. It is key. It is not just for BME students; it is for all students.

I remember that in my training year I had to do a placement in another school, and it was in Croydon. Two girls said to me, "But your parents are Jamaican. How can you be a science teacher?"—it was not computing for them. For me, the penny really dropped as to just how key it was. They could not see beyond that immediate context. Students can begin to visualise and see themselves in what they are exposed to, so in my experience I think it can be significant for all students, but especially those from minority backgrounds, to have those role models.

Q152 **Carol Monaghan:** Sometimes we hear about careers advice not directing youngsters into areas where they could be incredibly successful. I will talk about STEM in particular. Is there an issue with careers advice being



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offered by people who do not have an understanding of STEM and STEM careers?

**Claudenia Williams:** That is a great point. I cannot comment too much on that, but it could be a reason. If students do not have an understanding of the options available to them, it could limit their choices.

Q153 **Carol Monaghan:** What if they are told that physics is like maths and it is too hard?

**Claudenia Williams:** I think some of those messages can be picked up quite early on. For students, it will take some time to erode those stereotypes and challenge what it means to study science or STEM subjects. It is through the curriculum, resources, spec points and having role models and leadership roles that we will see changes. If that is to be sustainable, we still need schools to be held to account. If diversity is important in one school it will happen, but if it is not an issue and it is not a priority for a school leader it will not happen. We need something to ensure that it remains a priority and remains a conversation on the table. In these conversations, whether it is about careers, the curriculum, picking your option subjects or recruitment, diversity in STEM needs to stay on the table. That is what we need to do to make this happen.

**Russell Hobby:** There is a perception not only that STEM subjects are hard but that humanity subjects give you more options later in life and that if you pick those up you can go into any career. The opposite is true. If you have some STEM qualifications, even if you do not want to work in STEM later on, those are hugely powerful in employment opportunities. We need to get those messages across.

Q154 **Carol Monaghan:** Who sends out those messages?

**Russell Hobby:** I think we all do in some respects. When I speak to my own kids, I talk about maths being hard to do because I find it hard as well.

Q155 **Carol Monaghan:** I say the opposite to my kids because I think maths is easy.

**Russell Hobby:** I am speaking of my own preconceptions here, but even in the media and the art we do it is considered to be a tough and demanding subject.

It asks a huge amount of teachers for them not only to master their subjects but to be aware of what the ingredients are for future careers and different dimensions of that. Why would they know about those topics as well? I think there is a need for specialist careers advice and for the corporate world to step up and say, "If you are thinking of having a career in finance, for example, maths and physics are both very useful qualifications in those whom we recruit." The fact is that these days in



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finance people with technological skills as much as anything else are being recruited.

We cannot leave it to teachers alone. In England in particular we have quite a distorted job market. The City demands lots of STEM skills for non-STEM topics. There are some very prestigious and incredibly highly-paid careers in computing, technology and maths that are a drain on manufacturing and other forms, too. That is just the nature of the economy we have built.

**Q156 Katherine Fletcher:** I want to pick up something you said as an aside previously. I cannot believe it. You are telling me that there is no formal mention in the curriculum of female scientists like Ada Lovelace, Marie Curie, Katherine Johnson or, to be biased, my personal favourite, Mary Anning.

**Carol Monaghan:** Even Jocelyn Bell Burnell.

**Katherine Fletcher:** Yes. Is that true?

**Russell Hobby:** I saw you pass a note when I said that and started to look it up because I began to doubt myself. The data that I have is that there is not a single woman's name explicitly featured in the national curriculum for GCSE science.

**Q157 Katherine Fletcher:** There are lots of complicated things, but there are some easy things. There is no Ada Lovelace, no Marie Curie, no Jocelyn Bell Burnell and no Katherine Johnson, but we are going to inspire the next generation.

**Russell Hobby:** In the national curriculum, that is the case. Some of the exam boards include female scientists in their exam specifications. As far as we could find, two female scientists were explicitly named in the exam specs of the three major exam boards when we last looked at this in 2020. I know the exam boards are reforming things as we speak, so they may have changed that. Of course, it is up to individual schools; no one is stopping them mentioning them at all, and they will step in.

**Katherine Fletcher:** I am very conscious of time, but I just want that on the record. Thank you. Thank you for the inspiration from the rest of you as well.

**Q158 Chair:** Sam, you have worked in and around education policy for some time. In answer to Chris Clarkson you said that you did not think that inclusion had been a central focus of successive Governments' interest in education reform. Given what you have heard from Russell Hobby in response to Katherine's question, does that surprise you? Do you recall any conversations during the time the national curriculum was being debated that these things were important?

**Sam Freedman:** They were mainly focused on the history curriculum, which is the thing that people like to talk about the most because people will have a view on history. It is worth noting on that point that the



national curriculum is much shorter than most people think it is. There are very few people named anywhere in it in any subject. It sounds worse than it probably is to say there are no explicitly mentioned female scientists because there are very women mentioned at all in any subject. There were not particularly conversations around it, certainly at the ministerial level, when the national curriculum was being designed. I suspect there was at the subject level. It has not been a priority of the DFE, certainly for the last couple of decades, and I doubt before that.

**Q159 Chair:** Thank you. Finally, in that context, given that there has not been very much done and there is a lot of opportunity to make a difference, you are someone who takes quite a radical view of things. One of the dangers of an inquiry like this that the Committee is undertaking is that different Committees, and perhaps predecessors of this Committee, have looked at inclusion in STEM and commended initiatives that have been making a local, or even a national, but incremental difference, but it does not change the dial. If we are to be really serious about gripping this problem, can you think of any initiatives that might be highly controversial? You mentioned your bursary point of paying £75,000 rather than £25,000. Would that be enough to have an infusion of physics teachers into the teaching profession? Have you given any thought to really radical rather than incremental policies?

**Sam Freedman:** If you are talking radical, first, we have talked a lot about the financial structure of going into teaching and removing every barrier you can, which I think is important, and you can be as radical as you like in how much you want to invest in that.

Most of this problem is about prior attainment. If you control for prior attainment, diversity in itself is not particularly a strong indicator of subject choice. If you want to be radical about how we approach attainment, we have to look at much bigger, broader reforms that perhaps are not specifically about diversity but would have a massive impact.

To the question on how parents support their children with numeracy, we are one of the very few countries in the world that do not make maths mandatory after 16. That would have a huge impact on adult numeracy, which has a huge impact on parental support for young people. That is the kind of thing that you can think about.

You can be really radical about making university entry much more inclusive than it is at the moment. One of the policies I have been interested in for ages is the Texas idea of saying to every school in the country that you get a number of places at top universities regardless of the attainment of those pupils.

There are lots of things that we can do to make the whole system more inclusive that are not specifically about diversity itself but would certainly have a positive impact.



**Chair:** Thank you. That is very clear. It has been a fascinating session. Thank you very much indeed to Sam Freedman, Russell Hobby and Claudenia Williams. Thank you for your evidence today. It has been extremely helpful.

## Examination of witnesses

Witnesses: Professor Oliver and Professor Ramnani.

Q160 **Chair:** Our next pair of witnesses is Professor Rachel Oliver, the director of the Centre for Gallium Nitride at the University of Cambridge, and a representative of the Inclusion Group for Equity in Research in STEMM. We welcome her today. With her is Professor Narender Ramnani, professor of neuroscience at Royal Holloway University of London.

We have been talking about schools principally in the previous panel. We are now looking at the higher education system, both of which you are part of, which comprises teaching and research.

Professor Oliver, give us a perspective from the group that you represent and you are part of, which has made a study of the challenges of representation in research and universities.

**Professor Oliver:** I am representing the Inclusion Group for Equity in Research in STEMM. We are a group of about 100 scientists, student science practitioners, engineers, and STEM folk from all disciplines and from all across the country.

Our perspective has been to address the funding system. We are talking about scientific research and the funding that we get to do scientific research. That has a huge and overarching impact because, if you are recruiting into your universities your permanent staff who are going to be your main teaching staff, you are largely doing that on their research record. That is the single biggest question that is asked of the people who are applying to be your lecturers, who then become your senior lecturers and your professors.

The research funding infrastructure has a huge effect all across the piece. We are seeing that, consistently, women, ethnic minorities and disabled people are less likely to apply for that funding, but when they apply for that funding they are less likely to receive the funding they apply for, and when they receive funding the amounts they receive are smaller than the amounts received by their white, male counterparts.

Overall, we see that that research funding system is driving a picture where we continually push up the system a white, male majority demographic and have fewer opportunities for people of other characteristics. That then knocks on to everything: to who teaches, to who are role models, and to who is going into schools to do outreach and to exemplify science to school students. It reaches across the whole piece.



Q161 **Chair:** From your research, is this true of all under-represented groups, or are there particular ones who are disproportionately disadvantaged in this way?

**Professor Oliver:** It is true of all under-represented groups, but there are larger issues in certain areas. If we look at black representation in UKRI funding—our main research funder—roughly 2,000 grants were given out by UKRI in 2018-19 and 2019-20. In both those years, only 10 black principal investigators were awarded grants.

These are tiny numbers. If I start to try to talk about these numbers in terms of black women, there are so few black women that the numbers are simply not written down because you would be able to identify the individual when you started to write those numbers down. The under-representation is shocking.

Q162 **Chair:** This begs the question: given your research into this, give us your diagnosis of the causes.

**Professor Oliver:** I think there are a number of causes. We have to be honest with ourselves that there is bias in the system. We all have unconscious biases, and effort is made to make us aware of them, but those biases affect our decision-making processes.

There are a lot of decision-making processes that affect a scientific career. The picture we have built up at TIGERS from a lot of dialogue within the sector is that that disadvantage from bias essentially accumulates. These are very competitive grant-giving processes, with really marginal decisions being made. One person makes a biased comment reviewing your grant proposal, and because of that you very marginally—by a fraction of a per cent. effectively—miss out on that grant. You then cannot do that research. Because you cannot do the research, your track record is less good because you have done less work; you have not pursued your really clever idea that fractionally missed out on that grant.

Because you are not doing the research, your institution looks at your overall workload and says, “You are not researching. You can take on more teaching. You can take on this committee work. You can do this administration,” so you do not have time to prepare the next research grant. When, three or five years on, which is the typical timescale for these projects, the person who did get that research grant is coming up against you in the next competition, they are a huge step ahead, from that tiny bit of bias.

If we work out how that accumulates across a 40-year career, it perhaps is not surprising that we end up with a very large number of white, male professors and a very small number of black, female professors. That is really the heart of what we have to tackle.

Q163 **Chair:** Grant application processes and suchlike are based on referees. In a peer review system, you do not know the names of the referees.



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Surely, it should be straightforward simply to suppress the name and characteristics of the applicant so that grant decisions are based on the proposal rather than any knowledge of the applicant.

**Professor Oliver:** I would say two things. First, it is a good idea. Where that has been done—for example, by Science Foundation Ireland, in many of its processes, particularly its processes that address fellowships and funding for early-career researchers—it has been very effective, particularly in getting more women to apply and increasing the success rate for those women.

Beyond that, though, it is not necessarily quite as straightforward as you suggest. This is going to sound terribly technical. Do not worry about the detail. If somebody puts in a proposal on single photon sources using indium gallium nitride quantum dots without their name attached to it, that person in the UK is me because I am the UK expert. In fact, I am the world expert. The quantum dots do not matter here, but the fact that you can identify me from my science probably does. It is not necessarily always easy.

**Chair:** That is very interesting and very clear. Let me turn to some of my colleagues for questions, starting with Carol Monaghan.

Q164 **Carol Monaghan:** Professor Oliver, I will come to you first. I think we are getting a flavour of some of the issues here. You talked about looking at a research record whenever things were being considered. Certainly, I have been told in interactions that I have had that the research record will consider how many papers have been published by an individual, but if a female researcher has taken time off or is part time because of childcare responsibilities she will have produced less and therefore will be considered less worthy than somebody who has not been in that situation. Do we need to look at research record on a pro rata basis—how much has been produced per day at work?

**Professor Oliver:** We probably do. This is something that UKRI is acting on. It is starting to introduce what it calls the résumé for researchers, which is intended to take a more holistic view of a research career because it is in terms of number of publications. The other issue is that perhaps because of the challenges in the sector we see more women and more minoritised people doing the outreach work, running groups, providing service to the community, and we need that taken into account as well. That is where résumé for researchers is intended to allow us to—I think the phrase is—“value all the things”. It is important that we look at track record taking into account everything that is part of a researcher’s career.

Q165 **Carol Monaghan:** I would consider that as extremely important work. Is that at the moment considered less worthy than a publication?

**Professor Oliver:** I would not be able to speak for UKRI’s official view, but, if I am writing an application and I have space to write about one



thing, I would be writing about my key publications, not about my outreach work, although I do some very good outreach work.

Q166 **Carol Monaghan:** Of course, outreach work, as we have already heard this morning, is key for the next generation.

**Professor Oliver:** Yes, absolutely.

Q167 **Carol Monaghan:** If I am a young, female researcher—clearly, I am not young, although I am female—and I am doing a PhD and I have to take time out to have a baby and I want to return to my PhD, is the lack of childcare costs provided by the Government for PhD students problematic?

**Professor Oliver:** That will vary very strongly depending on the institution. There are institutions that will be supporting their students well in that sense. Their university will have noticed the problem. In terms of whether you can without support or subsidy from your university afford childcare in some of our big university cities on a PhD student stipend, the answer would be no. I could barely afford childcare on a professional researcher stipend.

Q168 **Carol Monaghan:** Specifically, I understand it is the case because a PhD is a stipend rather than a salary where tax and national insurance has been paid. Individuals are not then eligible for childcare costs.

**Professor Oliver:** They are not, as far as I am aware, eligible for any of the tax credit schemes that somebody like me would benefit from.

Q169 **Carol Monaghan:** Thank you.

Professor Ramnani, you put in a couple of freedom of information requests to UKRI. Can you tell us about what you found out?

**Professor Ramnani:** First, thanks for the opportunity to speak to this.

The freedom of information requests were based on curiosity. I wanted to understand how the gatekeepers in UKRI were constituted. I have been one of those gatekeepers, and I have noticed it is a very white environment. I asked UKRI whether they could tell me about the ethnic make-up of the committees on each research council. There are several research councils within UKRI. They have provided a breakdown of that.

I also asked them not just about the make-up of their committees, but how many committee meetings there were where there were no ethnic minority individuals present making decisions. The reason for that is that that is a measure that is much closer to the concept of inclusion because those individuals are actively making decisions and taking part in UKRI work.

Those were two of the main bits of information I asked for. The other one was what information and guidance they receive when they engage in the process of committee building. Are they given instructions to say, "You need to make sure that you give due regard to the gender balance of a



committee or the ethnic balance of a committee”? I received that information too.

Q170 **Carol Monaghan:** What did you find out?

**Professor Ramnani:** There were four key findings. One of them was that ethnic minorities have been very under-represented, as it turns out, on research committees, as I suspected they would be based on my experience of BBSRC committee membership. Over any given year for a given research council, the committee places taken up by ethnic minority participants ranged from 3% to 13%. It is important to bear in mind what the baselines should be here. There is a Royal Society report that was commissioned a while ago showing that in 2018-19 the ethnic make-up of the STEM workforce was 18.7%. There is a very significant discrepancy there. Overall, it was 8%. Overall, if you look across all five years of that dataset and across all research councils, 8% of committee places were taken up by people in ethnic minorities compared with the 18.7% who were in the STEM workforce. That is the first finding.

The second finding was in some ways more shocking. The inclusion of black participants was really low, but, worse than that, in the BBSRC, which is the research council I have the most to do with, there were no committee attendees who disclosed their ethnicity as black over the entire five-year period. I was very shocked to see that. I went back to the data and I thought that must be a mistake. Maybe there is a rounding error, the kind of rounding error that you mentioned before. Actually, in the way the data is reported, a zero in the tables that came back is a true zero.

Q171 **Carol Monaghan:** So, it was not a one that statistically became a zero.

**Professor Ramnani:** No. This was an actual zero. I was very shocked about that, and I have some ideas about what we might be able to do about that kind of thing later.

The third finding was that I wanted to measure the actual inclusion of ethnic minority participants—how many committees there were where no individuals disclosed their ethnic minority membership. Looking across all six research councils over five years—there is a lot of data here, by the way; about 14,000 committee places are involved in this data—about half of all committee meetings fell into that category. About 51% of all committee meetings across UKRI had no individuals who declared their membership of an ethnic minority. Again, that is very surprising and a little bit shocking. That varied from one research council to the next. In the best-case scenario, the Medical Research Council, the MRC, interestingly has no selection process. Every committee member is invited to attend every meeting.

Q172 **Carol Monaghan:** Who does the inviting?

**Professor Ramnani:** That would be UKRI staff. It is committee staff who would participate in the selection. They would draw from a pool of



experts. Seven per cent. was in the best-case scenario. Only 7% in one particular year had no ethnic minority representation, and at the other end of the spectrum it was 22% at the MRC. The worst-case scenarios were really quite shocking. For the Arts and Humanities Research Council, which funds some STEM research, its best number was 44%. Forty-four per cent. of its meetings at best had no ethnic minority representation, and in one particular year, 2015-16, it was 92%. In that year, 92% of meetings had no ethnic minority representation, or people who declared themselves to be members of ethnic minorities.

Q173 **Carol Monaghan:** To clarify, how many people typically would be on a committee meeting?

**Professor Ramnani:** It varies from one research council to the next. I am not 100% sure about the AHRC. I suspect their meetings are probably quite small.

Q174 **Carol Monaghan:** By small, do you mean five people?

**Professor Ramnani:** We are talking about maybe between five to 10 people, but I cannot be certain of that number. I know in BBSRC the numbers are much higher. From personal experience, I know that it is 15 to 25, roughly speaking. It is worth remembering that the pools of expertise that research councils can draw from tend to contain much higher fractions of ethnic minorities.

**Carol Monaghan:** Medical.

**Professor Ramnani:** Yes. I mentioned before that staff can draw expertise from a pool when making up a particular committee. Those numbers are not readily available in all cases, but if you look at the EPSRC peer review college, which is one of these pools, 16.5% of their pool have people who declare themselves as an ethnic minority. If it is 16.5%—and maybe that is roughly the same kind of proportion across the board for research councils—why do we have a scenario where so many meetings have no ethnic representation? I think that UKRI really needs to do the work to answer the question of why any of its meetings are devoid of ethnic minority representation. Ideally, that number should be zero, but we are seeing numbers of 50%, 60%, 70%. In the worst cases, I said 92%.

Q175 **Carol Monaghan:** Have you covered your four findings, Professor Ramnani?

**Professor Ramnani:** There is one more finding.

**Carol Monaghan:** I am aware of time.

**Chair:** Briefly, if you would, Professor Ramnani.

**Professor Ramnani:** One more finding was that I was sent a lot of material that was issued to UKRI staff—their written guidance—and only one particular research council, the ESRC, explicitly mentions the



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requirement to consider ethnic balance, whereas most mention the requirement for gender balance. Those were my key findings.

Q176 **Carol Monaghan:** Thank you. My colleague, Rebecca Long Bailey, has some questions coming up about how this might affect funding decisions, so I will move on.

Finally, I will turn to Professor Oliver again. You have talked about some of the issues that exist within research. We hear a lot about short-term contracts in universities. Can you tell us how these impact on diversity in the workplace?

**Professor Oliver:** Absolutely. Most projects are three to five years. Sometimes they are only one year or 18 months. Typically, you will, as a permanent researcher, be recruiting a postdoctoral research associate to join that project. They are on a contract, the duration of which is the duration of the project. If in order to take up a post at a university far from your current home you have to move your entire family with your children, that can be very difficult. If you are from a socioeconomically disadvantaged background, you cannot call on lots of money right now to get you moved. People may be able to borrow from mums and dads, but if that is not there for you, you may not be able to afford to make those multiple moves. If you have a disability and you need to have specific arrangements and adjustments put in place, or you need your housing or other domestic situation to be adjusted, it may be very difficult to have continual motion. Precarity is a problem for everybody, but it is specifically problematic for a number of under-represented groups.

Q177 **Carol Monaghan:** Who would not have the agility to move as required.

**Professor Oliver:** Or who would not be able to cope with the continual axe hanging over your head that your job will end soon and you will have to work to find another one.

**Carol Monaghan:** Thank you, Professor Oliver and Professor Ramnani.

Q178 **Dehenna Davison:** Professor Oliver, I will start with you. In our opening session, we heard from Professor Jeremy Sanders from the Royal Society's diversity committee. He said that in terms of improving the current situation many institutions, it appears, and people working in those institutions are quite reluctant to change. Would you agree with that analysis?

**Professor Oliver:** There is will in the institutions to change, although not necessarily across the board. The question becomes cyclical. The funders have a slight tendency to say, "We have very nice policies, but the institutions are not pushing their ethnic minority candidates or their female candidates forward. It is an institutional problem." The institutions say, "We see the success rates that women, ethnic minorities and disabled people do not succeed as much. We are throwing them into the lion's den when we push them forward, so, of course, we don't." It is always the other person's fault. Someone needs to take responsibility.



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Q179 **Dehenna Davison:** Thank you. Professor Ramnani, would you agree with that?

**Professor Ramnani:** Yes. I do not have anything to add. I agree with all those comments.

Q180 **Dehenna Davison:** In that case, what is the best way to address that and to try to make people take responsibility?

**Professor Oliver:** In my opinion, and also in the opinion of experts I have heard speak on this issue, we need to take positive action to break down the barriers. I am not talking about positive discrimination, but positive action—things that break down the barriers to progression of minority groups. One thing we could be doing is having the funders use the financial handles they hold to provide incentives to put forward more ethnic minority or female candidates.

An example of this is the Royal Academy of Engineering. It runs a fellowship scheme for younger researchers. It is often a stepping stone into a permanent academic position. Because it gets very many applications, it asks institutions to select three candidates each year to go forward to this funding competition. It realised that that selection process was selecting out minoritised candidates, so it said, "You can have four, but your fourth one has to be from a group who is under-represented in engineering." They made an extra opportunity, and then they are seeing many minoritised candidates come forward. That body of fellows is now about 30% female when the engineering student body is only about 16% female. You can see the effect that positive action is having.

Q181 **Dehenna Davison:** Professor Ramnani, what sort of steps would you like to be seen to be taking?

**Professor Ramnani:** Steps to be seen to be taking for—?

Q182 **Dehenna Davison:** Specifically to try to break down the inertia that currently exists in improving diversity.

**Professor Ramnani:** The funders are part of the solution here. I think they need to incentivise. I agree with positive action as a step forward. My own institution is running student trip schemes that involve positive action. We can also give UKRI some credit. It has started funding schemes that encourage more people from ethnic minorities and under-represented groups into PhDs.

**Dehenna Davison:** Thank you.

Q183 **Rebecca Long Bailey:** Professor Ramnani, just to go back to your shocking findings on the under-representation on research council committees, how would you describe UKRI's response to those findings?

**Professor Ramnani:** It has been extremely disappointing. A number of questions ran through my mind when I saw that data. One overarching question is how it is possible for a major UK research body to say that it



is fulfilling its public sector equality duty with data like this. Questions like that have to be answered. One problem with UKRI, I feel, is that it seems to be very typical that its timescales for responding to these things is glacial at best. The evidence that I have looked at has been accumulating over five years.

What has UKRI been doing with the data for five years? It has never been published. The results have never been reported. Why not? What are you doing with the data? Just to illustrate the point, the first FOI response was dated 13 October 2020. There is still no public acknowledgment of that data. Worse still, there is no action plan that has been published to deal with it. All I have seen is a tweet in the last few days, but I have also seen its submission to this inquiry. To its credit, it cites my submission and acknowledges it, but it is a shame that it does not have its own work to cite on this. It needs to have done work to have dealt with this. If you look at its point 18, it says, "We will look at this again in the summer of this year," or words to that effect.

There is also a lot of missing information. The FOI responses were not able to report a lot of information. For example, what about diversity and inclusion at the very top of UKRI? What does that picture look like? I asked for that, but for data protection reasons it has not been forthcoming. It needs to find a way to provide that.

The other key thing is that there seems to be a lack of vision and a lack of strategy in UKRI when it comes to dealing with EDI. The current strategy looks to me to be a little bit fractured. Every research council is doing its own thing and applying different standards. It does not look like there is any drive coming from the top of UKRI to the research councils to say, "Here are your goals. We want to see evidence-based EDI targets and we want to see these particular standards applied." We do not see that. It has been slow. It has lacked strategy. You have heard some of my other criticisms.

Q184 **Rebecca Long Bailey:** Thank you. Very briefly, what action would you like to see UKRI take?

**Professor Ramnani:** There are four particular things. One thing it can do immediately is to change the guidance to staff on all research councils to include a requirement to ensure ethnic balance in their committees. That does not need further consultation. We do not need more committees and inquiries for that. We know what to do. It is a question of updating the guidance. That is a day's work.

I also think that there needs to be clarity, coherence and a really strategic vision of what UKRI ought to look like if it is going to be inclusive. I just do not feel that UKRI has that picture in front of it, and it needs to develop that picture with the help of external expertise.

I was very interested in TIGERS' suggestion that maybe there needs to be an external auditing body to do this. It also has its own external



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advisory group. Maybe there is a case for it to be making more use of that group. I would be quite interested to see what that group is recommending and whether those recommendations have been taken up.

The third thing that I would do is insist that UKRI signs up to a commitment in its new equality, diversity and inclusion strategy to commit to monitoring, publicly reporting on, and ending under-representation in its decision-making structures, beginning right at the very top of UKRI and then working its way down. Because of the time-related issues, I have also suggested that it needs to commit to time-bound actions. We cannot have this ongoing sluggishness in the nature of the responses. Those are my key recommendations.

Q185 **Rebecca Long Bailey:** Thank you. Professor Oliver, what would you like to see UKRI do?

**Professor Oliver:** I very much agree with what Professor Ramnani has just said. One of the key recommendations in the evidence from TIGERS was the concept that we do not just want UKRI to do this, but that we would recommend that an independent body be set up to audit it. Essentially, we say that UKRI should not be marking its own homework.

We are talking about a situation where there has been a lack of progress across decades. I was shocked in some senses by the depth of problems that was revealed by Professor Ramnani's analysis. When I thought about it, I was not that surprised, largely because EPSRC, one of the councils, has been reporting its panel make-up for several years. I think it is the only council that does.

The data says exactly the same thing: that there is a good representation of ethnic minority folk in the college, that they are not drawn on proportionately as reviewers, that they are drawn on still less as panel members, and that they are hugely under-represented as panel chairs. It has had the information and done precisely nothing with it.

There should be an independent auditor. That independent auditor should be looking at the data, checking that it is analysed in proper and granular detail, and that action is taken on it.

I have some other suggestions, if you have time to hear them, about other roles that the auditor could play.

**Rebecca Long Bailey:** Yes, please, do elaborate.

**Professor Oliver:** The second thing it could do—and it is not just UKRI; it is the other UK researcher funders—is scrutinise whether it is spending public money and whether it is meeting its public sector equality duty more broadly. There is very widespread use of equality impact assessment in the sector. Are those equality impact assessments meaningful? Do they include genuine mitigations of the discrepancies that are arising, or are they just a regulatory fig leaf to get past the Equality Act?



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The third thing it could do is act as an independent place that dealt with complaints about bias, prejudice and equity issues.

If you make a formal complaint about an equity issue to the official UKRI system, I think the word “glacial” was used. I would go with that word. It takes a very long time to get a response. The issue by that point has swept past, the impact on your career has happened, and there is no means of redress. Also, that procedure leaves people feeling exposed. They are basically complaining to the people who have control of the money that controls their career. That does not feel safe, so people choose to see genuinely unpleasant, biased comments in their referees’ reports for their grants and say, “I will pull myself up and I will just keep going and not complain.” We need a safe complaints procedure, and that could also be with the external auditor.

**Rebecca Long Bailey:** Thank you, that is really helpful.

Q186 **Katherine Fletcher:** We are hearing, frankly, quite a shocking catalogue of omission. May I ask for both of your perspectives on what UKRI and the other research institutions are missing out on from this lack of diversity? You are both clearly experts and exercised on this topic, so I would very much value your brief perspectives, if that is all right. Ladies first, Professor Oliver.

**Professor Oliver:** There are two things. It is not just what UKRI is missing out on; it is what the nation is missing out on. First, there was a big study done in the US that used, essentially, machine learning to study 1.2 million PhD theses going back across decades looking for markers of innovation. What they found is if they looked at minoritised groups, specifically women and ethnic minorities, those theses showed more markers of innovation, but if you then looked at the future careers of those people, they had less recognition, less funding and less progress. We are missing out, potentially, on the most innovative minds.

The second thing we are missing out on is certain research directions. When there was a special call on Covid and why Covid has affected BAME communities more than the white community, many black people put in proposals to that and none of them was funded. Their proposals lent towards looking at social conditions, broader societal issues and less toward genetics and biology. The proposals that were funded have gone down one stream, and a set of issues that are important to the black community, and may actually be life-threatening to the black community, have been left out.

**Katherine Fletcher:** Understood.

**Professor Ramnani:** I totally agree with all of that. The only thing that I would add is the benefit to individual researchers. Being on a UKRI committee is a marker of recognition. It is something that goes on to the CV. It is something that your institution will use to promote you if it can.



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If you look at these numbers, how many people have missed out on that opportunity?

Q187 **Katherine Fletcher:** I understand that, and that is very articulate, but what are the institutions shooting themselves in the foot because they are not getting in a nutshell? Is it that diversity of thought and innovation?

**Professor Ramnani:** Absolutely. The perspective of a black scientist, or an Asian scientist in my case, when they are dealing with the kinds of health issues that Professor Oliver mentioned will be different. I know that we are supposed to be subjective in everything we do as scientists, and we are, but there are perspectives that are brought to the table that could benefit particular groups and society as a whole that you would not see if you kept all these people in the margins.

**Katherine Fletcher:** Understood. Thank you. I know better than to keep Graham Stringer waiting.

Q188 **Graham Stringer:** Professor Oliver, you gave a very convincing account of very slight discrimination leading to large discrimination. Do you have direct evidence of that? Can you point the Committee to hard evidence, or is it a suspicion based on the outcomes?

**Professor Oliver:** The outcomes speak for themselves. The thing that I cannot give to you is individual reviewers' reports, but I have seen reviewers' reports where specific negative comments are made regarding people's gender or ethnicity. A colleague of mine in an engineering department had a grant proposal put forward that she had led. The comments said that she was not a research leader, she was merely a lab manager, and the proposal should only go forward if it was handed to her senior male colleague. Given that the person in question is not a lab-based scientist—they are a computational modeller—and they do not have a lab, let alone them being a lab manager, I cannot really see why that was said except for a wrong picture of what women in science can be.

Q189 **Graham Stringer:** That is a pretty devastating example. It may not be possible to answer this question simply, but are you saying that the funding bodies are guilty of sins of omission or sins of commission? Are they prejudiced by design or accident?

**Professor Oliver:** It is not an "either/or"; it is a "both and". There is unconscious bias in all of us, and that shows up in the reviewing even when we try to deal with it. There is in places a lack of knowledge about the issues in the people handling these questions in the research councils. When the researcher I am thinking of rang up the funding council in question to talk about that issue and say that she did not feel she had been refereed fairly, she was told, "There are no red flags in those reports."

Q190 **Graham Stringer:** When I addressed a similar problem some years ago



with recruitment and people only recruiting white men to a particular position and only white women to lower grades in those positions, we made it very public, not only that the process that the interviewers had to go through was a consistent method, but that the person who did not get the job could challenge that decision. What I understand you to be saying is that, because of the nature of science and funding, challenges like that are particularly difficult. Do you have a solution to that? When I was doing it, just the very knowledge that the process was challengeable changed the results because the interviewers knew that they were being looked at. Do you think that would help to make it more public, or do you have more detailed proposals?

**Professor Oliver:** More opportunity to challenge and address those decisions would be a good idea. I do, however, have a more radical proposal. We all spend a great deal of time writing these research proposals, but we are all also people who have been through a very arduous and taxing process to reach the place we are at. Essentially, you can be recruited via your excellent research record, your brilliant publications, your outreach, your contribution to the scientific community into a permanent role in science and find yourself with literally no money to do the scientific research you have been recruited to do.

My suggestion would be that we should have a separate income stream that just gives a small grant to everybody who has reached a certain level in their profession where they should be leading research. In the TIGERS submission, we called it the universal basic research income. I am not suggesting sweeping the grant-giving process away, but if everybody had access to enough research income to keep a small programme ticking over and to be getting preliminary results so that they can then put in strong proposals, the problems that arise because there are biases in the system would not be so cyclical.

We would be able to break those cycles because people would still, if they encountered an issue, be able to go forward. They would be able to then attempt the next proposal with the publications with the track record and with preliminary results. As a concept, what I am talking about is cutting through some of the red tape that ties up researchers away from their research and strangles progress on diversity, and releasing scientists to get back into actually doing world-leading science more but also cutting through the impact of bias by making sure that the excellent people we are recruiting into UK universities have some money to go forward and get that work done.

**Graham Stringer:** Thank you.

Q191 **Aaron Bell:** I wanted to ask about this universal basic research income proposal because I read your submission. You said it is an ambitious change. You have already talked about a lot of things we need to do with data and auditing and so on. How much would that be? How would it work? Who would administer it? Is that additional funding, or could we do it with the existing funding streams and just reallocate them?



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**Professor Oliver:** This is not originally my idea. The original idea as addressed to the UK system comes from a chap called Professor David Payne, who is at Imperial College. He came up with a costed version of a UK basic research income, and he said it would cost £1.3 billion per year. That is obviously a lot of money. We set that against the UKRI budget at £8.6 billion per year.

My feeling is that, if you were to institute a universal basic research income, it would take away some of the pressure. Some people would apply for fewer UKRI grants because they would be able to make the progress they want to at this time using that money. Some of the money would come out of the UKRI budget, but it would need some new money. This a timely moment to think about this because the Chancellor has pledged to increase UK research and development spend to £22 billion by 2026. If we are going to spend more money, we need to think about spending it well. This is public money. It should be spent fairly. This is, at base, a question of fairness. It should be spent effectively, and effectively probably means bringing a greater diversity of people and ideas into this space.

Q192 **Aaron Bell:** That is the overall cost of the scheme. How much would that be per researcher? How much would the income be to them?

**Professor Oliver:** I think David was budgeting on £50,000 per researcher per year. I am not entirely sure.

**Aaron Bell:** We can check the detail.

**Professor Oliver:** The details of his costing are in his article for Wonkhe, which I can easily provide you with a copy of.

Q193 **Aaron Bell:** Finally on that, in your submission, you also thought that this scheme could be a way to align incentives about inclusion as well. Could you talk us briefly through some of that?

**Professor Oliver:** I would not necessarily want this scheme to go forward without incentives to do with inclusion because I am not here in the room talking to you to cut the red tape and make life easier for lots of white men, to be honest. I would say that each institution is going to be responsible for who has reached the stage in their career where they qualify to apply for or be given this income.

We need to be setting them targets for what proportion of the people who are getting this income should be from different groups—women, ethnic minorities, disabled, less advantaged socioeconomic backgrounds, and LGBTQ. If they do not meet those targets, we need either incentives or disincentives to try to push them to do so. There either needs to be a stream of extra money that allows institutions that are doing well to do more or a cutting off of the income, or a reduction of the income, to those institutions that are not doing so well because universities understand the bottom line.



Taking it further, there would then be PhD students or potentially postdoctoral researchers employed using this income. As a second stage, we could think about auditing the ethnic make-up and the gender balance in that group of employees and, again, requiring that the institutions do better. UKRI could run this, or a separate body could run it, but it needs external audit—the oversight that we care about diversity and we are making sure it happens and there is a body that says, “This is our priority,” and that has the power to enforce change if the required improvements are not seen.

Q194 **Aaron Bell:** Thank you. Professor Ramnani, I do not know whether you are familiar with this proposal. Do you have any comments about it?

**Professor Ramnani:** I am intrigued by it and I am fully supportive of it. It is a brilliant idea. One thing I can say is that it will remove an enormous administrative burden from UKRI as well as the time and effort that is expended on writing grants that then do not end up being funded—which in UKRI’s case is probably something like 75% of grant applications—and that take months to write.

Q195 **Aaron Bell:** There would still be a grant process on top of this. Obviously, this is a basic—

**Professor Oliver:** It is an underpinning funding. I was thinking about it earlier. There was a teacher here earlier saying that they had not had enough money to do their photocopying. You do not have a teacher come into an empty classroom at the beginning of the year whom you have just given a teaching job to and say, “You have to write a proposal so that you can have a whiteboard, some exercise books and some chalk.” That is basically what we are doing to young researchers coming into the system.

**Aaron Bell:** Thank you, both.

Q196 **Chair:** Thank you very much. To finish on that point, Professor Oliver, you mentioned the short-term nature of contracts, especially for early-career researchers. Do you think that universities are acting unfairly in practising that model when other organisations give permanent employment even though they do not know for certain that they are going to have income in the years ahead? Most commercial businesses do not know for sure that they are going to have an income, but they have a workforce predicated on that basis. Why should universities operate as a standard on short-term contracts?

**Professor Oliver:** Universities’ practice has been forced to be normalised slightly on this in that you have to make people redundant now when they leave these short-term contracts. It is very difficult because these are specialist skills. Somebody who can work in my lab growing my quantum dots, whatever they may be, is not necessarily the right person to work in my colleague’s lab developing light-emitting polymers, for example.



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There is a place for universities to make more long-term contracts for researchers. One of the advantages of my universal basic research income system is that it could be used to reduce precarity. If you always knew there was money coming in, possibly not one PI with their aliquot but a group of PIs could choose to have a postdoctoral researcher employed very long term on that guaranteed annual income. For somebody like me as an individual, honestly, if this money were coming my way each year, I would be using it to bridge my postdocs between contracts so that they were no longer precarious, in effect. There are benefits across the sector to this type of approach.

**Chair:** Very good. That is extremely helpful. I thank Professor Ramnani and Professor Oliver for their evidence today. We have further sessions to continue what is a very important and fascinating inquiry.