Ep. 3 - The Role of the Professional Engineering Institutions: Driving the Transformational Change

00:08 Hello and welcome to the SheCanEngineer podcast. In this episode we will be discussing the role that professional engineering institutions have in driving diversity and inclusivity in Engineering and we are joined by two very esteemed guests, I am delighted to welcome Nigel Fine, Chief Executive of the Institution of Engineering and Technology (the IET) and Dr Alice Bunn, Chief Executive of the Institution of Mechanical Engineers (IMechE).
Hi Nigel and Alice, thank you so much for taking the time to talk to us. Please could we start with some introductions – starting with Nigel, please could you tell us a bit about yourself and your career journey?

00:46 Laura, thank you very much indeed and it's delightful to be on this podcast- thank you very much for inviting me! Yeah, my career journey - I suppose my Engineering started as Civil Engineering, a Civil Engineer. Probably started off by playing Lego and Meccano as a small lad, and saw a motorway being built at the bottom of my grandmother's garden when I was about 11, 10-11. I thought that looked really interesting;- all those big machines, some massive earthworks, and I was just fascinated by them. So I found out what it was - it was Civil Engineering, and I thought 'that's what I want to do!' and that was sort of the way in which I got into the engineering profession. And then I studied Civil Engineering at Manchester, worked for John Laing Construction, working on construction programmes in the UK and overseas; went back and did my MBA at London Business School and then I've been in a range of different jobs over the last 40 years, ranging from marine coatings to working for a water utility- Thames Water, working for Experian, and then coming to the IET as Chief Executive. Now, the only thing I'd say is all of that has been a bit of serendipity really, you know, you don't wake one morning and think you want a particular job, but what tended to happen in my case was that at various points, I'd get a phone call and, you know, often, it didn't sound quite what I wanted to do. But you know, I asked a few more questions, took a bit more interest, and suddenly found that actually it was a really exciting opportunity and that's really how I've, sort of, landed the jobs I've done and even the IET role I accepted is probably similar. I didn't know the IET particularly before being engaged in the conversation but, you know, once again it sounded like a really really exciting opportunity and that was 13 years ago and I've been at the IET ever since. So, you know, one of those journeys - if I ever give advice: never turn away a phone call, always be interested because you never know what doors might open.

02:55 Yes, I completely agree... seize any opportunities that you find interesting! I think it's a very good piece of advice and actually it's really fascinating the range of careers that you've had to date. Alice, please could we have a bit of an introduction to yourself and your background?

03:17 Thanks, Laura, and thank you also for having me on your podcast. I feel very honoured to be in such fun company. And so, gosh, my Engineering career! So, probably started about 30 years ago, so when I had, I lived in the middle of the countryside and couldn't wait to get out and about so I had a motorbike. And I very successfully took the motorbike apart very regularly on our driveway and I slightly less successfully put it back together again every time, but I'm a bit better now. And I guess for me, maths and science always came very naturally, so they were quite easy, you know, choices education-wise for me. I did a degree in metallurgy at Leeds University, which was, kind of, again something of a lazy choice because I was studying maths, physics and chemistry and material science is a pretty much perfect merge of maths physics and chemistry, so I didn't really need to take any decisions, I just needed to carry on. So I did that. And then I did three years of research which was wonderful, at Cambridge University. I had an industrial sponsor which was fun. I got to travel up to Rotherham very regularly and slosh molten aluminium around. But the research world- in the end- I decided it was not for me and I was very really inspired to advocate for science and engineering more broadly. So my career began at the Science Museum. Um, I spent some time there. That was actually my third brush with space because I had had an experiment flown in space already, but it was while I was at the Science Museum that I worked in the space gallery, but also where I learned about the tremendous power of our space missions for environmental monitoring back on Earth. And that that really, really interested me. So unlike some of my colleagues in the space sector, who were those kids that gazed out of their bedroom window from, you know, as early as they could, wondering at the stars, that wasn't so much me, but I was very, very interested in that practical down-to-Earth benefit of space missions. So I had about another 20 years or so, variously interrupted by career breaks, either for different jobs, or for having kids, and then about six months ago I joined the Institute of Mechanical Engineers - which was a jump, much like Nigel said, it was a transition, if you like, within a career, but like most things, it makes sense looking backwards. And there are some really, really common threads, in particular space. Obviously, as a sector epitomizes some of some amazing mechanical engineering, often really, really stretching our limits. But it also acts as a really good showcase for the necessity of working in teams for international collaborations, for the sharing of best practice and knowledge, and that really is at the heart of a Professional Engineering Institution. So that really was the appeal. And I've been here about six months.

06:22 Are you enjoying it so far?

06:25 Yeah, absolutely. Absolutely. I often say there's never a better time to be in a Professional Engineering Institution. And the reason I say that is because I think now more than ever, you know, technology is changing really fast. There's pressures coming from things like climate change, you know, population growth - which are going to demand an ever more intelligent form of engineering solutions to support the way we live. So I think it's a really, really fun place to be.

06:56 So you both have had quite varied journeys and interesting Engineering career backgrounds which have led you to take on senior – well, chief executive roles within your respective Professional Engineering Institutions. As you know, SheCanEngineer is all about celebrating and promoting diversity and inclusivity in engineering, and I know within the IET and the IMechE there are various things that you do have, like awards and initiatives to celebrate D&I. But I was wondering if you could tell us a little bit more about some of the stuff that you do, and whether you think that they do actually have an impact and whether you've actually seen any impact, I guess this question in particular for you, Nigel, in the 13 years within the IET - if you've seen how much the the D&I initiatives and activities that the IET do have an impact on engineering as a whole?

08:02 Yeah I think - Yes, it's a great question. I mean I can't imagine, 13 years ago, being asked to be on this type of podcast on this subject, I just don't think it was necessarily on our radar or anybody's radar to the extent that it is today. So obviously really pleased that it's now embedded in everything that we do each and every day. Over the last few - definitely over the last few years we have really started to become much more aware of the importance of the ED&I. I'm really pleased that we've got a strategy and we've had it for several years now and it's quite a detailed piece of work and and thanks to many colleagues who've really done a lot of work to look at the whole ED&I landscape and it does cover so many protected characteristics that we need to be aware of, about what we want to be inclusive as an institution. And so we're, sort of, clearly working to a strategy which is important in any activity that you have a strategy, and we do. I'm really pleased that we've got the Royal Academy of Engineering's progression framework, which, I think, virtually all, now, of the Professional Engineering Institutions are contributing towards and it's really a great way of measuring how we're doing against a whole range of different characteristics to ensure that we're inclusive as an organisation. And it's good, then you can benchmark yourself against other organisations, be they engineering organisations or indeed science organisations. So I think we've come a long way in having a framework and of course for many of us from science and engineering backgrounds, you know, if you can't measure something, you can't really manage it, and data is so really important. So I think we've made some really good progress in those type of measurements, but also the

events that we all run, many of us run different events- at the IET, we've got the Young Woman Engineer of the Year competition which has been running for over 40 years and I must say it's probably the most inspiring event that we do in the whole year and after I leave in the evening I'm often seen skipping along the Embankment in London because it's been such a joyous affair of celebrations of, you know, really inspirational engineering. So I think we've made- we've done a lot of good stuff, and I suppose to the point of 'are we making a difference?' Well, yes we are. We are, it's slow, but we're making a difference. A few years ago, we ran a campaign along the lines of nine percent is not enough, 9%. The figures that we had at that time about five years ago. But the engineering workforce was 9%. Now today the figure is 14.5%. So yes, we are moving in the right direction - are we good enough? Of course we're not. No, we should be - and have to be 50%. So we're making those steps, but we do still need some transformational change.

11:06 Alice - the IMechE is, I guess, a little bit different to the IET. It's a little bit more specialised and mechanical engineering is almost notorious for having a very low percentage of women within the industry. So within the IMechE what sort of things do you do to promote gender equality and diversity within mechanical engineering? I know you've only been there six months, but do you think that actually they do have an impact and do you see that change coming through already?

11:46 Yeah, definitely, definitely. I mean very much along the lines of, you know, what Nigel has just said now. We are seeing change, there is no room for complacency, that's for sure. I would say I would characterise really the effort needed at, sort of, two different scales, actually, if you think of a sort of push-pull. So on the one hand we have done and continue to do a lot of educational outreach exercises. We continue to make sure that we're role modeling in the right way. So when we're making those interventions in, you know, typically at school children - primary secondary level, they can identify. They can see that engineering could be mechanical engineering, could be a career choice that would work for them. Similarly, we're working with the universities to make sure that the universities' degrees that are on offer speak to the broadest possible part of our society. So if you like really, really maximising the pool in our society, who might be interested in taking up engineering as a career. Then on the other side of that, we have to make sure that as a sector we are working in the most inclusive way possible and we have to make sure that we are welcoming absolutely every part of our society into the sector, making sure that we create an environment where everyone feels willing to contribute, everyone feels able to contribute, everyone feels that their voices are of equal magnitude. And actually one of the things that we're doing in the last few months is running a, sort of, internal training programme, if you like. Because inclusivity is not necessarily an automatic skill for all managers.

So actually we found that a diversity and inclusion training programme just to help our organisation run and help our community run in a way that is most inclusive, can be really, really impactful. I think just you know, while we're on this subject, the other thing that obviously has happened in the last couple of years - that we need to not lose sight of the opportunity within is the fact that we've all been working remotely; we've all been working from home, we've all sometimes been working funny hours because of the global pandemic. Now- this job that I took about six months ago was the first time I've worked full time for 17 years. And in those 17 years, I never applied for a part time job because frankly, the part time roles weren't very interesting for me. I applied for the job and if I got offered the job, I negotiated like crazy to work part time and keep the job - that is all changing now. I think suddenly we've had a real 'Eureka' moment about flexible working and I do think that can be really, really impactful if we're thinking about inclusivity in the workplace. So we mustn't lose sight of that opportunity.

14:39 Can I just come back on that point - I think it's such a really important point that Alice has raised. You know, so often I hear that, you know, we were losing young women from the workforce because employers were not offering that flexibility because, you know, they may be having families and so forth. And, you know, that was such a shame because, you know, very talented, very well trained young women in engineering were being lost and were not necessarily being brought back in by different means. And I think that has changed and maybe as Alice said, the pandemic has actually transformed our way of operating and the need for greater flexibility. But also we know that there's such a shortage of engineers in the workforce at the moment. The problem -it's not getting better. it's still a big issue. We do surveys and I'm sure Alice does this as well, you know, to find the supply and demand of engineers, so, you know, we are going to make sure there are a plentiful supply of engineers today and in the future, we just need to make sure that we continue to be flexible and offer flexibility to work to all to young women, of course, but men as well. You know, everyone has different, I think, needs these days and therefore getting the best out of people to meet the demands of industry and society, and also give good opportunities for employment. It just needs a completely different mindset, and I think we're starting that journey. I just hope that, you know, we clearly want the pandemic to be over, I don't want us to go back to what life was before.

16:20 Yeah- I mean, I should have said the reason that I can now work full time is because my husband, who works in a very traditional sector, is now easily able to work part time from home. So you know, everyone can win here. And I think, you know, careers are changing. You know, people don't go these, sort of, cradle to grave, you know, single sector careers anymore. So this flexible working really enables a new type of career path.

16:45 I agree- I do think the pandemic has really helped- almost forced- industry to really get on board with flexible working. Which, I guess, in turn does contribute to creating an inclusive workplace. And I also think in recent years, things such as shared parental leave has really shifted the mindset and allowed more flexible and inclusive workplaces for not just new mothers, but also new fathers.

17:19 I think it's very different now. I remember when my children were born, I was back at work in the afternoon, so to speak. But now, I see with my children and their partners, you know, they are getting more time as a couple to share the responsibility - family responsibilities, and I think that's great, and I think it needs to be encouraged. But not only is it good for family life, I think it's good for- in the end, I think it's good for employment because you have your people who give more of themselves to their jobs because they got more stability at home and they've got more balance in their lives. So I think it's changed enormously over the last 30-40 years for the better.

18:03 Alice, you mentioned the STEM outreach activities that the IMechE do. In another previous episode, we spoke to Alex Knight and I know that Alex has done lots of stuff with the IMechE and the IET. And we talked about the importance of STEM education and starting early. And both the IMechE and the IET and lots of other professional institutions have many educational programmes, and in fact I think the IET and the IMechE have a collaboration on a joint grant scheme for engineering education. So it's very clear that you recognise the importance of STEM and particularly engineering education. I know that one of the institutions', like, primary goals, is really to bring in more membership. It sounds a little bit controversial, a little bit money grabbing, but at the end of the day they need to make some sort of money; when you're investing lots and lots of money into educational schemes and these outreach programmes, it sounds like it's counterintuitive to your goal of bringing in membership, because if you're talking to younger kids, for example - they're not going to come and join the professional institution straightaway. So, my question to you both is, why do you invest so much resource into STEM education? And why do you think it's that important that actually it doesn't matter that it may affect the bottom line negatively- or is it negatively?

19:42 Oh well goodness me, there are so many different ways of answering that- let me take a stab first! So the most direct way of answering it is we do it because we're in charity and as a charity, you know, our primary purpose, our primary benefits must be realised to society at large, not to ourselves. So that's a very simple answer. And that's why, you know, we have lots and lots of initiatives going out into schools, etc. I think the other more, kind of, nuanced answer really is that we know, You know, we know that you need to take many, many different

interventions in any individual's educational career choices and, you know, not a single intervention can be attributed directly to that individual taking up a career in engineering. A previous colleague used to describe it as, sort of, rungs on a ladder and you need to put all the rungs on the ladder in place to allow that child to progress all the way through to a career in engineering. So I think it's in all of our interests to make sure that all those rungs are in place. One observation I have and it's largely because of the age of my kids at the moment, is that Engineering is a fantastically hands-on kind of sector, you know, it's what really appeals to me about it. It's very practical, it's very tangible. And yet you have this thing called work experience, typically when you're kind of 15,16 or 17 years old and in my experience, it is invariably a wasted opportunity because it's very difficult for kids at that age to be able to have a meaningful, kind of, work placement, a meaningful work experience which enables them to really understand what a career would look like in engineering. Now, sit in a Professional Engineering Institution such as ourselves - we've got 115,000 members; surely we can do something to help here! Surely, we can do something about this! So this year we're gonna take a new look at that. We've got a launch of a new initiative, if you like, trying to provide some kind of matchmaking offer to make sure that through the institution we can give, you know, young people today an opportunity to have an experience of what it would be like to work in the engineering sector. And in doing so, hopefully, to encourage them to go on and take up to degrees and careers in engineering. But you know, there are many, many different steps needed, many, many different interventions. And as I said earlier in this podcast, we know that the challenges of the future, the challenges facing society, are gonna need more engineers. So it really is in all our interests. It's a benefit for us, but it's definitely a societal benefit too.

22:22 So if I can just add to Alice's comment, I think you started it off, absolutely right, you know, we are a charity, we are charities and the beneficiary of our charities are our society at large, it's the public. So we have public responsibilities, we're not for profit organisations. And, you know, Laura - your comments about how do we - you didn't quite say this, but how do we balance the books in a way to actually fund STEM enrichment activities, which are generally net cost activities? So yes, we all run commercial type activities, we have membership activities - which will generate, obviously, income for the institutions as a not-for-profit, then we have to spend that wisely and STEM enrichment programmes do take a lot of that money in order to build the next generation of engineers and technicians. So that's, sort of, the model, if you like, of the institution, and the way about them is, and as Alice said, there is a huge demand for engineers and you know, as the world becomes more technologically enabled, we're gonna need more young people with knowledge and skills, and, you know, science skills and maths skills and so forth. And therefore, you know, getting into primary and secondary education to actually try to explain what engineering is all about, because, as we know in this country, engineering is not

particularly well understood or professional engineering is not particularly well understood as a career, and other countries of course we know are more advanced. But in this country, in the UK, we still need to do more work. And what we're trying to do I think is to bring to life the practical application of some of the more academic studies, so the maths and science and how do you relate that to problem solving, creating things that will benefit people? So it's not trying to be overly elaborate, but doing it in a way that appeals to young people at different age groups. As I mentioned before, one of the things that really helped me when I was young was working with Lego. Today, Lego as we know, is astutely advanced - we ran the first Lego competition here in the UK, which is fantastic. It's really - it's bringing young people together using Lego which they all love, using robotics, building business cases and marketing the activities, explaining the range of things that, you know, are linked to a technology science project. And just trying to bring it to life that says to young people and particular parents as well - this is what engineering is all about. It's about creativity, it's about problem solving, it's working together as teams, it's making things better, it's all of that and I think we have a duty of responsibility to do it because we need to make sure that we're priming the pump, if you like, of getting enough young people through interested in STEM, interested in engineering, and then going on to become engineers. As Alice said, there's lots of, you know- the ladder and the- there's lots of points where you've got to make those interventions, it's not just doing one thing only at the age of 11 or 12 or even younger, of ages four or five, you've got to keep doing it all the time so that they go with us on this journey through primary, secondary, tertiary education, and hopefully then embark onto an engineering and science career. And the jobs are gonna be out there. The jobs are out there. So the more that young people are developing their skills earlier on, the easier it will be for them to transition from the world of education into the world of work. But it's a big job. And we need to do it not just for the kids, but we do for their parents and their teachers and all the other influences on young people.

26:28 I definitely agree that awareness of engineering and engineering careers is not just for the kids, but all of their adult influences, like you said - teachers, and parents, guardians. So, from my experience, I was fortunate because I had a Physics teacher during my A Levels who suggested I looked into Engineering. But I didn't have that awareness of what engineering was prior to my A Levels and my other teachers really didn't know either and my parents definitely didn't know how great engineering could be, so perhaps if I had these, sort of, programmes to get involved in earlier in school, I'd have probably made up a long time before my A Levels. So in a previous episode, we spoke to Dawn Bonfield and we talked about the reliance on volunteers to do a lot of the leg work in terms D&I promotion and outreach work. These volunteers are very much the outward 'faces' of the institutions and we do tend to find that they come from minority groups, gender or otherwise, and mainly because they recognise the need

for those visible role models. But aside from the D&I committees, or boards, or working groups that you have within the PEIs, I don't - or, you can correct me if I'm wrong, but - those faces, those volunteers, those visible role models that we tend to use to do the outreach - those faces aren't always representative of the whole membership. So are we relying too heavily on those volunteers to do that legwork, to become those role models, and is that of detriment to the rest of the membership? Do they feel like they're not being included? … That's a tough question, sorry!

28:36 I think Nigel and I are just looking at each other to see who is going to move first! I think it's a really interesting question actually, Laura, because if anything I would have - I would not have made the same assumption. So let's start off - the volunteers are absolute heroes. I mean, they really do so much work for the institutions. I think the institutions would simply grind to a halt without the volunteers. It's absolutely incredible. And I think what you've described is perhaps some of the more visible activity of the volunteers. But actually the volunteers are really, I mean they really are the engine room of the institutions, in supporting, for instance, some of the, you know, accreditation activities, registration activities, helping, you know, us to process the applications from the new cohort of engineers in the society. So I think a lot of what the volunteers do is behind the scenes too. And probably if you looked at that in its entirety, you would find that they're quite representative of the institution as a whole. What we do need to make sure is that those volunteers are properly supported. We need to make sure that, you know, we are doing as much as we can to help them help us and that's something that isn't a task and finish activity, it is something that needs to, you know, run on and on. I think Nigel mentioned it earlier on actually in this call, he mentioned the progression framework where we look at whether or not we're doing everything we should be doing to encourage diversity inclusion. I think that is likely to expand in a slightly broader framework a few years down the line to include ethics and sustainability as well. And I think it's really important that in terms of support for our volunteers, we make sure that we are always giving them leading edge support. We make sure that we're always giving them the kind of support that they need to be doing the work of the institutions for the challenges of the future. And I think a lot of those challenges of the future sit across and overlap with diversity and inclusion, ethics and sustainability.

30:52 Yeah- I think Alice, you've covered a lot of that actually. I think I would certainly fully endorse your comment that volunteers are the heroes, the people, the heroes of the of the of the institutions, absolutely. I mean about four and a half thousand volunteers around the world, who are just absolutely amazing. They give up their time freely and they are passionate and they are absolutely committed to the institution and to engineering at large. I think many of them do see the broad picture, that we're trying to collectively as Professional Engineering Institutions

to do things that benefit society and so outward looking as well as inward looking. And there's, you know, there's just such a range of things that volunteers can do. Some clearly have aspirations to be trustees and to be involved in the governance of the institution. Others want to be involved in the outreach programmes, they just enjoy and are passionate going into schools, as STEM ambassadors, and exciting young people about, you know, engineering. Others want to be involved with professional registration or going into universities to the accreditation programmes. And I could go on; there's so many different things that volunteers do, and it's like a parallel world for many people. They obviously have their day jobs, but they also get in huge amounts of personal satisfaction in being a volunteer within a Professional Engineering Institution. And I think we're quite unique as professional societies in offering a range of really interesting things for people to do. They can change, it doesn't mean that they just stay with one thing, they can do different things. And I often find talking to young people that young people who find - well, when I say 'young people' I should mean 'early career', that's perhaps a better way of describing it, who just, you know, new into the career and they find themselves in some form of governance role as a volunteer with an institution. The learning that you can get and the experience you can get in these roles - it's just fantastic, things that they will do that they ordinarily might not get to do in their paid-for jobs until they're, you know, more senior. And it's a safe way, in a way, it's a safe environment because you can learn and you can experience, and yes, there may be some mistakes, but, you know, but we'll all come together to support individuals. And it's safe because, you know, you can learn and develop in an environment where you've got the people around you that will try at they're very best to help you progress that knowledge that you need as your own career develops. So I think there's some really unique opportunity - I wish I'd known to be honest. You know, going back when I was starting off my career, I wish I'd known about the opportunities of volunteering- whether I'd gone into governance type roles or when I've gone into more enrichment type roles - it doesn't really matter, it would be just great experience and, you know, they are terrific. To your point maybe about the sort of representation of volunteers and role models - I think there is- I've noticed a change actually, and that's where we're seeing a lot more diversity in our volunteers and they are terrific role models of course for the jobs that they do, whether it's in the governance of the institution or whether it's going out into schools or going out into STEM outreach activities. So I think it's changing, it will take a probably a bit longer for there to be a much broader range of people involved in volunteering activities in the institutions. But I think it's very positive and certainly it's terrific to see, you know, a lot of women taking leadership positions. At the IET, you know, we didn't - it was only about 7 or 8 years ago when we had our first female president and now we've had two. I'm obviously, you know, delighted that under my watch that we've made that change and long may continue. So things are changing, they are changing for the better.

35:18 Your point about the skills you can learn when you volunteer for the institutions- it's something that I've gotten a lot out of - volunteering and getting involved with the Royal Aeronautical Society. And I think you've, in part, answered my next question, which is - why should engineers, of any age, at any stage of their career, get involved with their Professional Engineering Institutions? And also the role that the institutions play within their career development - and not just purely for the professional registration aspect.

36:04 Sorry Nigel! So I've said this a few times already this year, I think, we're 175 years old as an institution this year and I really, really believe we should be more relevant than ever to society. And why is that? Well, it's not just around professional registration, it's much more about that lifelong requirement, you know, the constant upskilling, reskilling and development that is needed to tackle some of the challenges that we have today. You know, putting that in context, I heard this as a sort of little stat the other day, and you can roll your eyes because it might be a little bit less, it might be a little bit more. But it is said that about 85% of the jobs that will be done in 2030, so not very far away, 2030, are unknown today and they're unknown because of the level of innovation that's going to happen between now and then. That constant change that technology brings and therefore that constant need for the sort of upskilling and reskilling and, you know, we know that most of that innovation happens at the interfaces. So we are the Institution of Mechanical Engineers, but actually we're a very broad base, we've got a very wide range of divisions and groups, so if we can structure ourselves so that you get those groups interacting and that is your highest chance of getting the innovation that I think is gonna be really, really critical to society going forwards. So that would be my pitch, for why an institution is important for any engineer.

37:41 And all those jobs that are not even known today, but they will be with us in, you know, within the next 10 years, they're all going to probably require a combination of science, technology, engineering and maths. Because that's where, you know, jobs are evolving now. So the more the young people know about STEM and the more that we continue to develop people's knowledge, the more employable they will be. But the- we use a term at IET for our members, it's called a 'professional home for life'. And I love that term because actually it's what it's all about. It's actually- being a member of a Professional Engineering Institution is something you do for, hopefully for life, and you start, you know, when you're just entering the profession and you continue into it when, you know, maybe you've stopped full-time paid employment, perhaps doing more volunteering type activities. And I think it's that sense of belonging, being involved into something, having that professional home that you can meet like minded people, you can have access to knowledge, you can have access to upgrading your skills, you can go to events, you can join programmes, you can contribute - it's a very unique environment. And it is

usually relevant, but we have a job to do. We can't just say it's relevant and think that engineers who haven't yet joined us will queue up at our doors to get entry. We've got to go out and actually make sure that we are continually changing ourselves with being modern, we're being relevant, we're being inclusive, in order to make ourselves attractive to the needs of the next generation. And the next generation needs are probably very different to the needs of, you know, when I was entering the profession 40 odd years ago. So we need to be very mindful of that, and one of the things, of course, that we see a lot of now is that - I think the current generation are much more aware of sustainability, environment; they like purpose-led organisations. And of course, Professional Engineering Institutions are purpose-led organisations, and they want to make a difference. And I think we are in a unique position, I agree with Alice totally - this is a fantastic time to be part of a Professional Engineering Institution because I think, you know, we may have been around - in your case, Alice, 175 years, and we're just mere 150 years last year. But we've been around a long time, yet, you know, we're still as relevant today, but we need to make sure that we are always looking to the future, always, I suspect the reason why we have existed as institutions for so long- we've always changed and evolved to meet the needs of society and the professional at that time, because if you don't, you become extinct. And I think, you know, we've been successful at that and long may we continue to be serving the needs of society and the future membership for many years to come.

40:53 Thank you so much for answering my somewhat difficult questions! Now we're running a bit over, I apologise for that! Just wondering if you had any, sort of, final thoughts or reflections before we closed?

41:06 Laura, thank you very much for the opportunity to come on to your podcast. It's great to have the opportunity to speak to people through this media, I guess social media, that we may not normally get the chance to engage with. I think the opportunity for us to be ambassadors for the Professional Engineering Institutions is really important and, you know, I'm sure this would agree with me - I hope you agree with me anyway - we are ambassadors, you know, we've got a job to do to spread the word about our respective institutions about engineering in the UK in a more general sense. And also, you know, clearly the one of the things that was very much at the core of, you know, of being asked onto the podcast and discussion is about ED&I and recognising how important inclusion is, that we need to be promoting engineering and technology to more people from very different backgrounds, ethnicity, gender, disability - because it's a really fantastic career, really rewarding, very exciting and makes a difference. And it's not because we want to actually ensure that we have members for the future - clearly, it has a role, but actually because society, industry needs engineers for the roles that Alice said that

we don't even know what they're going to be in the next 10 years, but they will want to STEM capabilities. So the more that we can talk about engineering, the more that we can excite people who listen to these podcasts who will think about engineering, perhaps go and just investigate a little bit more. What does engineering mean today in the modern world? How do I get into engineering? Who can I go and talk to? I feel we've been privileged to have the opportunity to come and chat to you on this podcast, so thank you very much.

42:57 Well said, Nigel. And yes, let me add my thanks too, Laura. It's been it's been fun to chat. Gosh, any final thoughts? You know, we have to be careful not to fall into the trap of when we talk about engineering, assuming everyone knows what we mean and actually put in the right context out for engineering is really important. So engineering isn't just the big, you know, the fast cars and the, you know, rocket engines and the new bridges and what have you. Engineering is really absolutely a thread throughout all of our society, and I think the more that we can do to convey that message, the more successful we will also be in our commission to be inclusive. I said earlier I spent a long time working in the space sector, and it was often said that, you know, space inspired children and it was always evocative of these, sort of, pictures of rockets. And I used to balk that a little bit, I used to think that we were doing a discredit to our younger generation because actually I think they're much, much more thoughtful than that. And I do think issues around mainly sustainability and climate change are a much more meaningful motivator for the younger generation than, you know, just the ability to fly to the moon - she says "just"! So setting that context is really, really important because engineering seriously does touch every part of our lives.

44:20 It does, it really does! Engineering really does touch everything! So on behalf of the SheCanEngineer committee, I'd like to thank both of you for this really insightful discussion, and I've really enjoyed it and I hope you have too, so thank you very much!

44:39 Super! Thank you, Laura!

44:42 Thank you, Laura! Keep up the good work!