

Vivienne Parry

Science broadcaster

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Welcome to media Masters, a series of one to one interviews with people at the top of the media game. Today I'm joined by the science broadcaster Vivienne parry. A scientist by background, Vivienne started her career as the national organiser of Birthright, the mother and baby charity.

She made the move to full-time journalism in 1994, becoming presenter of Tomorrow's World, panorama and also fronted a number of documentaries for Radio 4. She has gone on to lead a varied career in the media, writing columns for the Times, the Guardian, and the News of the World, and feature articles for Tatler and Woman and Home. She was also Good Housekeeping's resident agony aunt, Lydia Mogg.

Now blending her media career with a role as head of engagement at Genomics England, she is also author of The Truth About Hormones, and was recently awarded an OBE for services to the understanding of science.

Vivienne, thank you for joining me.

My pleasure!

That is quite a career so far. Do you ever find any moment to relax?

Yes, I do! I do, but it is strange. I have fingers in many, many pies and I have a very unusual media career, because it's covered the whole span. So it's broadcast, it's print, but it's not just print in say just the posh papers...

The august journals.

The august journals. It's also in the News of the World or in Woman magazine, so I cover the whole range.

The full panoply. The full range, as it were.

Indeed.

With backgrounds in immunology and genetics, do you think a scientific background was important for your grounding as a journalist? Because there's a lot of generalists now that they write about science.

I think the thing that drives me always is curiosity, and I think curiosity is something that's common to both journalists and scientists. The trouble was, that I was a completely rubbish scientist. I broke so much equipment! In fact, I was begged not to do any more practicals because I, well, I was told they couldn't afford to teach me because I just broke everything. So really I wanted to do a career that was in science, but it couldn't be science. And I think that what drove my journalism was something I also had in me, which was a real itch to write. So it was those two things. And it's interesting, isn't it? Lots of people – I mean, Ben Goldacre is a classic example – he'll say, "Oh, you shouldn't be writing about science if you haven't got a science degree." I absolutely disagree with him, because if you look at some of the very best science correspondents, I'd look at say Mark Henderson who used to write for The Times, he was a history graduate for heaven's sake! So you don't actually need science. It's a bit like saying, "Oh well, unless you have a degree in economics you can't write about pensions." The point is that you have to get to grips with something and then be able to explain it in a way that's readily understood – and some people can do that and some people can't.

And not having that background in science might give them an advantage because they've got to be able to explain it to themselves first so they can understand it, and that might help them articulate it to other laypeople.

Exactly. I'd probably be brilliant, although I've never tried, at explaining physics because I'm really bad at physics! So I have to work extra hard to understand physics and explain it, but luckily I keep to life sciences. That's right.

And do you think it is difficult when you've got a slightly esoteric issues like physics, and even life sciences, trying to engage the general public in this kind of writing? So people are very interested in it and others not.

I don't think you can appeal to everybody; you can't hit people over the head with a fish and say, "You must love the Large Hadron Collider."

We do love it on this podcast.

I bet you do! It's a very... can I say with... I'm going to cause chaos here, but I do think it's a bit of a boy thing, the Large Hadron Collider.

Because it's large?

Because it's large.

And it's a collider, isn't it, smashing atoms into one another.

Yes. Yes. So I think there are some things that that people are very interested in; there are always the big three, aren't they? Space, dinosaurs and the end of the world, you know, those kind of things that will always interest people. And I think it's curious that even though people claim that interest in science isn't great and that it has to have an application always, actually the things that really interest people are things that are just about wonder.

I mean, you mentioned the end of the world there, I think the current thinking is we're all going to die in an entropic heat death, aren't we, many, many billions of years from now.

Very possibly!

Are you right to say then, that there's certain issues that the people are interested in, and then you have to kind of struggle to get people interested in other things? And then one of things I wanted to mention as well is, is there a certain kind of creeping anti-science agenda in the public at the moment, with the embracing of homoeopathy and alternative science and all this kind of thing? Even around normal dinner party tables now, people say, "Oh, big pharma, evil, they're out to get us." And I've read *Bad Science and Bad Pharma* with Ben Goldacre, and there's some legitimate criticism there. But you can't just say they're all evil and it's a big conspiracy.

No, I think there is an anti-science agenda. And I think that we have to be careful in science journalism not to censor ourselves. What I mean by that is, just go back slightly, in that I recently I've been involved in judging some awards in science journalism; really disappointing crop of entries for investigative journalism in science. And I think that's partly because of this very thing that you're talking about, that if you investigate science and you find it wanting in some area, somehow that's seen to be not playing the game, that you're undermining science and that it doesn't need undermining because it's fragile. I think actually the reverse; I think that science is very robust and it can take criticism, and it should have criticism.

And there's an openness there, isn't it? I mean, a lay person would say, if you take in terms of say, dietary advice, one minute the scientists say you should eat as many tomatoes as you can, and a few years later they're saying tomatoes are bad for you – I don't know who to believe. But the scientific

method is open; if the evidence is suggesting that tomatoes are good for you, that's fine – but if subsequent evidence comes to light, then it would be ridiculous to not change your stance given the evidence.

Yes. In science you're only right as long as you're right and there's no other evidence to change your mind. And we should expect scientific ideas to change over time.

So tell us about the move to science journalism. You were by your own account, and we'll have to take your word for it, a terrible scientist – but what was the leap like then, and why did you do it?

So, my first job was running a medical research charity. I worked with the Princess of Wales for many years, I ran huge events, but I also trucked round WIs of an evening, talking to them about nuclear magnetic resonance or whatever it was.

I don't even know what that is.

So it's what we call now an MRI machine.

Oh, of course!

So I did a lot of talking to people. And as I said, I've always been a writer; that's always been something that I've enjoyed doing. And the great Jane Reed, who was a fabulous, fabulous journalist, said to me one day, "Vivienne, I'm fed up of sending journalists to you to write about mother and baby research. Why don't you just write about it yourself?" So I started writing features for Woman's Own, and I really enjoyed doing that. And I cut my time down to do four days a week and do one day of journalism, and I was getting bored with my job.

In the four day a week job?

In the four day a week job. And I really, really wanted to do television. Now, I have some thespian genes in my background and I am one of those people that when the fridge door opens and the light goes on I'm tap dancing.

Jeremy Vine said the same thing when he was sitting in that chair. He said, "It's a gene; you've either got it or you haven't."

It's a show off gene.

Yes.

I'm sorry, it is the show off gene. And I cast about, thinking what now I really want to do. I came up with lots of telly formats and I thought this is never going to happen,

and then I decided I had to make it happen. So I resigned my safe job of 15 years. Everybody said to me, “Vivienne, you’re completely mad; you’re a Muswell Hill housewife with two small children, and you’re the breadwinner. Stop it.”

You’re crackers.

You’re crackers. And I answered this advert in the Guardian, and it said ‘television presenters wanted, must have evidence of science communication skills’. So I said that on any night of the week I was to be found in twilight rest homes for the elderly talking about nuclear magnetic resonance, and they said, “We’d like to see you – send us your showreel.” And of course I didn’t have a showreel because I’d never done any TV, so I fibbed a bit.

And to think that even advertise that in the Guardian! It would be unheard of now.

So I fibbed a bit and said that the broadcasters couldn’t make it available in the time, which wasn’t quite untrue. It was true to the extent that they didn’t have any footage, they couldn’t make it available in time.

It was technically true.

Technically true. So I said this, and rather reluctantly they agreed to see me for an interview, and I was thrilled to have even got into the BBC, and 4,000 people had applied for this job, which was to present, to be one of the presenters of Tomorrow’s World. And they were looking for somebody with science, and somebody who was a good journalist who knew a news story. Anyway, halfway through the interview, which was going splendidly, came the question I’ve been dreading, which was, “Exactly how much presenting experience have you got, Vivienne?” And at that point you can’t lie. So I said, “Well on a scale of not very much to bugger all, it veers towards the bugger all actually.” And there’s this great silence and I thought, “Well, that’s the end of that.” And then they said, “We’d better we better send you off to make a film.” So I got sent off to make a film, and that film was the first film that showed, it was on genetics funnily enough, it was the BRCA gene that people know for its involvement with breast cancer, and I went straight from running a charity to primetime BBC television on Tomorrow’s World.

And at the very, very basic and obvious question. What was that like?

Oh, it was the best job you could possibly imagine.

I used to love Tomorrow’s World!

If the BBC had come to me and said, "It's a copy of the Radio Times and three buttons," I would have said, "Oh, you're very generous! Let me have it." It was fantastic. I went all over the world, I would walk into places like MIT and say, "What are you doing? and these people would say, "Come right in, sit down, let me tell you about our 3-D television." "Let me tell you about our mouse with a human ear attached." "Let me tell you about earthquakes," or... it was just fabulous. It was the most wonderful thing that you could imagine.

Who were the co-presenters at that point?

So it was Carol Vorderman, who disappeared – you might remember there was that terrible drama about her appearing in a soap advert and she went – but it was Howard Stapleford and Philippa Forrester. Those were the other presenters at the time.

And you also did quite a lot of other stuff as well for Panorama and Radio 4.

Yes, I did a panorama, I did a programme called Morning Surgery, which was a daily programme... I mean, I still make a lot of films but I don't do much television now at all. To old!

Do you think that is an issue? Do you think there is ageism, then?

I think that's absolutely rife, yes. And particularly for women. But then on the other hand, I think we have to constantly move over for new talent. So in some ways, although I think there is an issue about women and age, I also think that you need to constantly find and replenish talent.

And do you not think the BBC are doing enough on this? I remember famously Mary Beard, of course, getting hugely criticised on her appearance. It seems to happen to female presenters much more than male presenters.

Oh, it does. It absolutely does. And it's quite interesting I think, that it's women who sometimes are the worst and most critical foes of women on television. I don't know quite why that is, but it's the same on Twitter. About more than 50% of – much more than 50% of – people who complain and make really misogynistic remarks on Twitter are women.

The mind boggles. You've made the study of cancer central to quite a lot of your work. Was that something deliberate or was that something that you just developed an expertise in? Is that something that you're passionate about in terms of advocacy?

I am interested by an enormous range of things. So I have many enthusiasms and an extensive staple of hobby horses, ranging from things like organ donation, public health, vaccines... cancer is just one of those things that I'm interested in, and I guess I know quite a lot about. And I've been lucky enough to make several documentaries on cancer, and funnily enough, right at this very moment I'm making a program for Radio 4 about personalised medicine. And we've already started down that road with cancer, and people will know that if they have, for instance, a breast cancer and it has this.... it's what's called HER2-positive so it has a particular marker on it, then they can be given a bespoke medicine, Herceptin, which will work remarkably well for them.

How do you keep your reporting exclusively scientific? Do you ever kind of stay into the politics or other societal aspects? So for example, you mentioned organ donation just then. I'm a big supporter of the presumed consent doctrine. Do you involve that in your reports? Because clearly countries that have that, where people have to register to opt out of it, have much higher donation rates.

You're wrong! You're wrong.

This is the evidence part, isn't it?

This is the evidence part! So, Spain for example, had presumed consent and its rates were really pretty abysmal and the same as us, and then they had a very dynamic new head of organ donation and he saw that actually it was the systems that were the problem, not the presumed consent. And so once they had started to put in place all the systems to make organ donation happen, so that people who were likely organ donors because of a catastrophic brain injury for instance, they were... the systems are in place that somebody would contact the relatives, that they didn't die in Accident and Emergency without anybody having seen them, all those kind of things. And he set up a system of organ donor coordinators – and that was the thing that made the difference. That was when Spain started to shoot up. And it's the best country in the world for organ donation. Now in the UK, in parts of the UK, I think in the east of England as an example, our organ donation rates without presumed consent are as high as Spain's. But in other parts of the country they're not as high. And there's something about the way that we operate, and the organ donor taskforce made lots of recommendations about changes to systems, and actually we increased by 50%, organ donation. But there's a problem also in that fewer people die, I mean fewer people die in motor crashes or car accidents or motorbike accidents, so there's not the range of organs available that there used to be. So things are changing, and maybe presumed consent might work, but I suspect that actually people might feel that they were being pressured, and when we were doing the organ donor work we found that there were quite a significant number of people who felt that presumed consent meant the state was taking organs, and I

think you'd only have to have one case of organs being taken when people didn't want it to happen for there to be a real undermining of the altruism that lies behind organ donation.

Well, I mean, I work in PR and I think I remember reading at the time, the PR disaster would actually be someone who had opted out but because of a kind of bureaucratic cock up or a computer error something, it wasn't properly recorded then of course that poor person's organs were then chopped out and were in other people by the time it was found out, so I think that there are certain dangers with it, aren't they? But do you think that... does that make the story more interesting when there's not only a kind of evidence-led scientific aspect, but there's also a strong human interest point of view? There's a obviously strong emotions, strong opinions for and against.

Yes, indeed, and I work at the moment a lot with the 100,000 Genomes Project and of course there are many, many ethical considerations, for instance, about sharing of data, access to data by commercial companies, access to data by insurers – which, by the way, is not allowed – and there's many other things that concern people, for instance, should you have whole genome sequencing at birth? Should you have a whole genome sequence of a baby done if there are things that you can find out that you would be able to treat at an early stage? Then there are the ethical issues about that, which is should the parents be told if, for instance, the baby has a BRCA gene, a gene for breast cancer that is a late onset gene. In other words, it wouldn't appear until well into adulthood. Or is that something that the child has a right not to know? In other words, for them, after the age of 16, they can decide whether they want to know that or not. It's not for their parents to tell them or to have that knowledge.

I mean, they're incredibly thorny issues, aren't they? They're more human issues than the kind of science issues.

Of course. Science...

But in terms of public policy though, the government has to make a decision as to what's going to work.

Yes, and I think that's something that you need to really debate with many, many people, and there will be different shades of opinion, just as there was about mitochondrial donation and three-parent babies, as they're called. So I think lots of people need to have an input, and I am very, very keen that people should have that debate – but that's quite difficult to have in the mainstream media.

Do you think the media does take science seriously enough? Because I mean, you've got BuzzFeed and all it's interested in is celebrity tittle-tattle, really. I

mean, I used to read the science section of The Times and they had they cancelled that about a year or two ago, that was a fantastic piece. It just seems to me that science reporting generally is on the wane.

I think that the UK has brilliant science reporters who are reporting on the kind of the breakthroughs, the Large Hadron Colliders, things like that. I think science suffuses everything that we do. It's part of our culture and it's a big part of the solutions for the future. Science doesn't exist by itself in a kind of vacuum, it exists within the whole of society. So evidence is never enough. For instance, scientists are always a bit miffed that evidence isn't the only thing that decides policy. But actually, there's a whole range of other considerations to take. For instance, it could be economic, it could be cost, it could be what the current views are of people, it could be whether it's electorally feasible...

And whether the government thinks they can get away with banning something or increasing something.

Exactly. So I think science has to exist in a space that is a contested space.

But do you think there's a tendency to kind of dumb down in the mainstream media? You know, these kind of lifestyle pop-science type shows? I mean, you and I discussed our mutual friend Jim Al-Khalili before the podcast recording started, and of course he's doing fantastic work on BBC 4, which has been seemingly under long-standing threat of cancellation. And Brian Cox also does a fantastic job on BBC1 and BBC2, but as he said – and Jim has mentioned this on the podcast that the stuff he can sell BBC4, the detail he can go into, that they will literally say to Brian Cox, “You can't go into that level of detail. This is BBC1.”

Yes, but I don't always think that it's dumbing down. Think about pensions; we're intelligent enough to actually understand them if we wrapped a wet towel around our heads and locked ourselves in a darkened room. But actually, we need people to explain them to us and we need to have it explained in really, really simple terms. We don't call that dumbing down. Yet why do we say about science, that if someone's explained something simply, that it's dumbing down? I think the whole thing about science reporting is that you should get something out there that sparks interest, that sparks curiosity, and if people then want to go further and become more involved in it, then there are plenty of avenues for them to explore. But if you don't get it out there in the simple terms, then people are never going to be able to grip this wonderful, wonderful thing that we call science.

Do you think though, you know, Tomorrow's World is clearly never going to be in the heyday that it was? It was part science, part Gadget Show as it were. Do

you think that that will be a strong message if it was to come back in the way that it used to be? Prime time show half an hour...

It's very interesting. If ever I go to a scientific meeting and you say to people in the audience, "Did you get into science through Tomorrow's World?" Almost everybody over the age of 40 will stick up their hands. It was one of the things that got me into science, certainly.

I miss it even now.

And I think we don't have the shows, and the shows that we do have follow a kind of formula. Either they're gadget-driven or they're, you know, explosion-driven, or the one that the BBC is particularly fond of at the moment, is that it all has to be about journeys and experiments.

So Liz Bonnin gets sent somewhere and there's some music and then something explodes.

Yes! But I think what we don't have is we don't have an outlet any more for some of the extraordinary innovations that we see in the UK. So I go around all over Britain, I see extraordinary kit that people are inventing, that people are developing, and if it's not a gadget there is no place for it on television for a six-minute film about some extraordinary invention that's coming out of, for instance, Innovate UK is funding huge amounts of stuff which is magnificent. But there is no place on British television, which is still the main source of science content for people. There is no place for those kind of things on the TV today.

Do you think the BBC should be doing more? Its mission is to inform, inspire and entertain and so on, I mean, the more technical the more science-y it's going to be, the fewer viewers they might have, you could argue. And can you blame a channel controller for commissioning less science, fewer science shows, because they're judged on how many eyeballs they get?

That's true, I guess, but I guess what happened to Tomorrow's World is that same old thing is that it got shoved around the schedules until nobody knew where it was, and it really dropped a lot of viewers, and then that was the excuse to shut it down. I always hope that it will be a bit like Top Gear. So you remember that Top Gear was also... that was its fate, and shoved around the schedules, and it was dropped, it went to the BBC cemetery and then it was exhumed and in the magnificent form that it then became, led by Clarkson, and I often hope that something like that would happen to Tomorrow's World; that there would be a new format, there would be lots of these fascinating things that were on there, and then it could revive. Because Tomorrow's World used to have huge ratings, absolutely enormous ratings. Then it was perhaps a more innocent age, so you could report the magnificence of

Concorde and its engineering, whereas now I guess if you were going to do a story about Concorde, you would have to do, "Well, the French hated us and there were all these arguments, and it was very noisy, and it wasn't quite green enough." There would be all the arguments and the controversies, rather than simply, "Oh my goodness, this is fantastic engineering."

There's a lot of debate about diversity and the lack of more senior women in senior leadership roles, and you've made some films for L'Oreal and UNESO and for the Women in Science program. Do you think that there is a problem here that's still to be addressed?

I think there's a huge problem. I think women are much more numerous at graduate level, so if you go just across the road here to UCL you'll find that there are undergraduate courses, things like psychology, things like biology, where it's 75% or 80% women. And yet if you look to those same subjects at a professorial level you'll find...

It's all blokes.

Well, it's not all blokes but even with all those women coming in, it's still only 15-20%, so something clearly is going wrong. That's just those sciences where women are in the majority as undergraduate level; it's much worse in subjects where like computer science or technology subjects where...

There's fewer women coming up the ranks.

Yes.

And is that just, without the risk of oversimplifying it, is that just pure sexism, maybe even unconscious sexism?

I think there's an unconscious bias. I think there's also, although people dispute this, but it's my personal experience of women coming through science, and I mentor a lot of women in science, is that they are less confident about applying for senior roles. So if a job asks for six attributes and a woman can't do one of them, then she'll say, "Well this isn't for me." Whereas if a bloke sees the same, he says, "Oh, well I'll go for it." And I think having things like 50:50 shortlists for women makes a big difference, because it forces women to be part of the selection process, and they think – much as I did when I went for the Tomorrow's World job – I didn't think I'd get that in a million years, I really didn't.

But you still went for it.

But I still went for it. And nobody could have been more surprised than I was, and I think there are a lot of women who have, as I do still, imposter syndrome. So I would have my key to the dressing room, you know, my star would be on the door and it would be Vivienne Parry, and I would run across the foyer of the BBC thinking, “Any moment now my former maths teacher Mrs Glass is going to pop up and say, “This has been a big mistake. I don’t what you think you’re doing Parry, but just stop it.” So I think that that feeling... men have it too, but I think it’s probably more prevalent in women.

It’s different. And what did you think to the treatment of Sir Tim Hunt? I mean, he was forced to resign from his honorary professorship at UCL by saying that women are a distraction in the lab.

Well, I was on the UCL Council at the time, and I know Tim Hunt very well, and I know his wife Mary, who of course was a dean of Life Sciences at UCL. And I think it was very unfortunate that Sir Tim – who is actually in real life not somebody who has a sexist attitude towards women in my experience, and I think that’s something his lab would agree with – that somehow it all rolled out of control in a way that became completely untenable. And I think that he shouldn’t have said those things, and...

They were in jest, weren’t they? He clearly meant it light-heartedly.

The trouble was, he did it in jest and then he went on the *Today* programme the next day, and when he should have said nothing and kept quiet, he dug a bigger hole for himself – and at that point I think his fate was sealed. And I don’t think he was sacked. In fact I know he wasn’t sacked. He had an honorary position and he himself wrote a letter saying, “I really have been a bit of a duffer. I’m really sorry, and I want to resign my honorary position,” and his resignation was accepted. In hindsight, perhaps it shouldn’t have been accepted. Perhaps we just should have said, “Look let’s all sit down and let’s take a long deep breath.” But unfortunately it kind of went nuclear before that.

And these stories tend to blow up ever so quickly now with the power of Twitter and social media, you know, within 15 minutes everyone’s completely agog and outraged over something. It is a bit ridiculous really, isn’t it?

Yes, I do think those things get blown out of proportion, and I think what I Sir Tim was probably talking about was his own experience, because his wife Mary worked in his lab. He did fall in love with her and he married her.

Do you think there’s a little kind of anti-science, anti-evidence issue there in terms of, you know, because strong emotions are whipped up so quickly that there isn’t this time to pause and reflect and actually take a lay of the land,

look at the evidence, and that it that it seems to be that we have a kind of anti-evidence society now? It's not even that we're ambivalent to evidence, it seems to be that we kind of actively eschew it.

I think there's always a kneejerk reaction. And I think people demand action at a speed which is much faster now than it was in the past, and I think it's very difficult for people to resist those clarion calls for speedy action. Sometimes speedy action is essential, but sometimes actually we should just sit back, think about things and then come to a conclusion and actually not be driven by a kind of mob mentality.

What have you learned from being appointed to the Medical Research Council? Are there important treatments that we need to do more to support?

Being on the MRC, the Medical Research Council's Council, was a fantastic experience because you're right there at the centre of what's going on in medical research in the UK. And as you all know, Britain is...

A leader.

A leader. I mean it's... I think something like a second in the world in regard to highly cited works, we punch way above our weight. The MRC does a lot of basic science research, so fascinating to see what was sort of coming up the ranks, as it were, and also very interesting to see the sort of clinical trials that are going on. I think my time there, and I've just completed my term with the MRC, taught me a lot about the way science works and the weight of evidence that's required in order to make decisions about future medicines and future treatments.

You were made head of engagement at Genomics England, which is delivering The 100,000 Genomes Project. How important could that project be for improving people's lives in the long term?

I think The 100,000 Genomes Project is extraordinary. It's the most exciting thing that I have ever been involved with, and that's saying something, given the science I've seen at close quarters. I was one of those people who, when the draft of the Human Genome Project was announced, stood up and said, "Oooh, it's going to be marvellous! By Tuesday teatime it's going to change medicine!" And of course it didn't change medicine immediately, because the issue was that it had taken something like 10,000 scientists collaborating internationally, 13 years, and \$2bn to decode one human genome. The step change happened, as so often in science, not because of the science itself, but because of changes in technology. So suddenly it became possible to sequence a whole human genome – so that's three billion base pairs –

Incredible.

In less than a day for less than \$1,000, and that cost is dropping all the time. And then coupled with that, you also had dramatic increases in computing power so that suddenly these huge amounts of data – and we're talking terabytes in relation to even probably one genome and all its associated data – suddenly, it became possible to manipulate that data to compare many, many hundreds of people, and then suddenly you began to see the wood for the trees. You were able to see, "Oooh, look – here's a really interesting thing. Here are all these people who've got prostate cancer and now we notice, because we've looked at them altogether now, we've noticed that actually all the ones who did really badly had something over here that we never knew about before, and they're the ones who did really badly." So now, we ought to always look for that variant because we know that we need to treat those people in a different, much more aggressive way than those other people who don't have that. So I think the era of genomic medicine and what The 100,000 Genomes Project is also, besides doing the research side, it's also trying to transform the NHS, so that you embed that programme, that genomic medicine programme, within the NHS so everybody can have it. So I think that's an extraordinary thing to be doing. Extraordinary.

And you think the societal impacts of it are still being felt? I mean, now there's an increasing awareness of celebrities, for example, that are opting proactively for double mastectomies because they know that they've got the breast cancer gene. Are we going to see some of this kind of pre-emptive surgical interventions because people know that they've got a gene for X Y and Z and they know they've got the gene for this, so they need to deal with it before it kills them?

I don't think so necessarily. Remember that, although we appear from everything you read in the papers, to know a lot about the genome, actually we know so little about it. So little about it. And the interesting thing is, that even if you have the most pathogenic of the BRCA mutations and you think, "Oh well, I'm a dead cert, I will get breast cancer or ovarian cancer," and I actually, although four out of five women do, one out of five women don't – so what you have in your genome doesn't necessarily predict your fate. And we need to be aware of that, because it's not just your genes. It's about the interaction of your genes with the environment.

Tell us about some of the exciting things that you've done in your kind of career in journalism. Who's been some of the interesting interviewees? I know you interviewed John Nash, famously, the mathematician who was famously brought to life in the film A Beautiful Mind. Who else has excited you, and where have you been in the world it's been exotic? Tell us some tales of derring-do!

Well I did. I did interview John Nash, and he actually died two days later.

Oh, wow.

Because I was the last person to interview him.

Wow, that's quite an accolade.

And he was the perhaps the most difficult person I've ever interviewed. And I swotted – I'm really bad at maths – so I swotted up for months beforehand, and I could tell you all about partial differential equations for a nanosecond or two. And I thought I would be in desperate trouble if there was a maths question and he went often to kind of the realms of higher maths, but actually it was a relatively innocuous question not to do with maths at all, and it came back a really convoluted answer, and I kind of snuck a look at the audience and I could see that they had no idea what he was talking about, and neither did I.

How do you recover from that?

And so I had to do that broadcaster thing, I was saying, "Mr Nash, that's been an absolutely fascinating insight, but what I'd really like to know about is..." and move it on. I know I've interviewed some extraordinary people. I interviewed Bob Weinberg, who was the person who discovered oncogenes, the first indication that we had that actually cancer was a disease of altered genomes. I, well, famously, I interviewed a man called Bob Langer who was a polymer scientist, and he was developing scaffolding for what we now know as tissue engineering, and perhaps the most famous film that I am I'm known for is – and it was not about me of it at all, it was about this extraordinary mouse with a human ear on its back.

I can visualise it right now as you said it. When you mentioned earlier I could picture it as well.

That was amazing! And I remember at the time we didn't we didn't feature it much in the film that we made, but I remember going into that lab and they were showing me how you could make an artificial trachea, so an artificial breathing tube, and the issue for people who have cancers in their trachea is that if the tumour is very large, if you cut it out, even though it hasn't spread to the rest of the body, you have a big problem because he can't join the two ends of the trachea back again. It's not like the gut, they don't stretch. So they were making an artificial trachea and they were... they had a little tube of kind of mesh and they seeded it with the patient's cells, and they tied it up like a little beef roast with a string, so it looked exactly like a beef roast, and then they'd painted it, the inside of it, with cells from the patient. What was extraordinary is that the cells that line our breathing tubes have these little hairs that beat in unison, that sweep the muck out of the respiratory tract, and this was work in animals that they were doing, but when they had put back this brand new bit of

engineered trachea, the cells with these little hairs on, the hairs began to beat in time with the hairs that were above it in the normal respiratory tract. So there was this beating going down, it was it was amazing. And of course, it turned into a couple of years ago, the first person who had an artificial trachea built in exactly that same way. So I've been incredibly privileged to have seen something right from the very start to its delivery.

Implementation.

And that's why I feel privileged to be with The 100,000 Genomes project, because I can see that it's already beginning to have an impact. So are already saying that for people with rare diseases where they don't get a diagnosis, they're just told, "You've got a rare disease, search us, we've got no idea which one it is, there are probably 8-10,000 of them. We don't know which one it is." But actually with a whole genome sequencing they are able to find what the cause of the disease is, and that means, for some, just a name and knowing which is enormously helpful to them, but for others it means suddenly you've got a mechanism and an idea of how to treat them, and the treatments can be not hugely expensive as people imagine, that people think, "Oh, whole genome, the answer must be hugely expensive medicines." Sometimes it's repurposing medicines that we've already got that are very cheap, and that you suddenly realise that actually the mechanism that's causing this disease is one that could be dealt with by commonly available drugs. But we never knew what that cause was until now.

Last question. Are you enjoying your current portfolio career, as it were, and what's next for you?

I've changed my career dramatically once in my life; I will almost certainly do it again. I have never been busier. I travel all over the world, I go to scientific conferences, I meet all sorts of fascinating people, I am loving learning new things all the time – and that's what a career in science gives you. It's eternal curiosity; it's being able to open a door and ask a question and then 20 other doors open in front of you, each beckoning to you, "Come in, learn more, learn more!"

I envy you actually, I think it's a fantastic job.

And it's a wonderful, wonderful thing to do. And science has run right throughout my life, so even the times that I was working with the Princess of Wales, even the times that I was looking confused at the world for heaven's sake, I was still getting involved with science. I am the only journalist you will probably ever meet who simultaneously had a paper in the Journal of Molecular Biology at the same time as writing a column for The News of the World, where my by-line was: "She's smart, she's saucy, she's only in the News of the World."

I imagine you use different language though, for the different journals, should we say.

Yes, and do you know what? It's much harder to write for The News of the World than it is for the Journal of Molecular Biology?

I don't doubt it.

If you write short, it's rather like Mark Twain said, "I'm going to write you a long letter because I haven't got time to write you a short one." You really have to think. And that's why I think the people who are the best science communicators of all are the ones that can actually use the smallest amounts of words, because less is so much more.

Vivienne, we're out of metaphorical tape. All it remains for me to do is just thank you for your time, it's been hugely enjoyable and I've learnt a lot.

Thank you very much, I've loved it.