I'm Dr. Lucy Stead. I'm a cancer research bioinformatician based at Leeds Institute of Medical Research at St. James's University Hospital. A bioinformatician is basically a biologist who uses computers instead of pipettes. So advances in technology basically means that we no longer have to run an experiment at a time. We can run hundreds, thousands, actually millions sometimes of experiments simultaneously. But what that means is a lot of results and a lot of data. And that's really forced, I suppose, the areas or the fields of biology to have to merge with computer science and mathematical modelling.

And that really is the role of a bioinformatician, someone who has expertise across both of those areas so that they can take really big data sets and absolutely exploit them in terms of the biology and medical information that we can get from those data sets pertaining to the question that we acquired the data in the first place, but then even more so exploiting them beyond what we might have even known that we could discover from them. My laboratory is my computer, so it comes with me everywhere. So as any other scientist, I have lots of meetings, workshops, conferences that I go to. But if I'm on the train, if I'm in a coffee shop, I've got my laboratory with me.

So what it does is mean that any time that inspiration hits, any Eureka moment, I'm there with my laboratory able to continue an experiment or make the notes that I need to, or change something that I need to in order to progress my science further. The great thing about what we do is we create these really large biologically clinically relevant data sets, and then we get to mine them for many different reasons. So you may commonly think of biology as being we think x, so we're going to look at y. Well, actually, we can turn that on its head with bioinformatics and genomics research, because we say we think x, and we're going to look at a to z.

So although y is in there, if that turns out not to be the right answer, we've got all of this other stuff that we can look at as well. So we can use our approaches to find patterns within the data and knowledge that we didn't even know that we were looking for, the unknown unknowns, as it were. And that is a fascinating and really interesting aspect of my job. We all know that technology is rapidly increasing. And what this really means is vast data, lots and lots of results.

So we have to have the people with the right skills and abilities to not just interpret the biology but actually take large data sets and know exactly how to handle and analyse them. The skills that are required to be a bioinformatician are an understanding of biology and an ability to do computer science coding and use of computational approaches. I mean, I would say anybody that is interested in becoming a bioinformatician needs an interest in biology and really just to be computer literate, because these are all skills that you can be trained with. From a personal side, I would say that a bioinformatician needs to be someone who can work at many different perspectives.

And what I mean by this is you have to have an understanding and a drive for the wider and overarching biological question. But you have to also have the ability to really focus in on the minutiae of the parameters that are being set in the algorithm that you're running. So it's that level of detail, but always being able to make sure that you can zoom back out again and think, am I doing this for the right reasons? And is it going to give me the results that I need, or the data that I need to make the interpretations that I require? So I think the role of a bioinformatician is going to only expand in the future.

As technology advances, we're going to have more and more demand on people that can deal with very, very large amounts of data. And I actually think at the minute that there is still a tendency towards bioinformatics to be seen as a service provision. So you have people which are highly trained in biology almost using it as a way to analyse the data and then feed back into what they're doing. I think what we're going to see is potentially more people like myself who have a real clear drive with the biology or the clinical question in hand.

So actually, bioinformaticians themselves will start to set and drive the research agenda, as well as be able to provide data analysis for other groups. So I think genomics has been quite impactful on clinical roles for several reasons. The first one would be that the clinician is more informed, so they are able to use the results of these tests to have a greater knowledge about their specific patient's disease. And this allows them to relay that information to the patient to try and predict survival better or in some cases, albeit not in brain cancer, to actually have better treatment choices, more effective treatment choices for that specific patient.

I would say that the other thing that it's done is add a layer of complexity to their role, because this is a new range of tests and a new type of science, I suppose, that they have to then understand. They have to know what tests are being run and why. They have to be to interpret those results in the best way possible for their patient. So that's added a little bit to their role in one sense as well.

What I would say, as a researcher, that I've certainly noticed is it's caused clinicians to maybe have a little bit of a drive towards research, because it's all very well if they have a set of tests which gives them a great deal of information, but actually that doesn't give them a better treatment at the end of the day. It makes them want to come to us and say, well, how do we get these better treatments? What research is needed? And therefore it's allowing them to come and have a slightly more research-based role as well.