

ETH Didier DEF.mp3

Jennifer Khakshouri: [00:00:04] Thank you for tuning in to the ETH podcast, I'm your host, Jennifer Khakshouri, and we're reaching for the stars in this episode again.

Didier Queloz: [00:00:11] My name is Didier Queloz and I'm professor of Physics and I will start at ETH on the 1st of September. At the same time, I will also be professor in Cambridge, Cambridge University, UK, and I will share my time between Cambridge and Zurich.

Jennifer Khakshouri: [00:00:35] We want to speak about Cambridge and Zurich later on. Quickly, you and Michel Mayor, you won the Nobel Prize for physics two years ago. Usually retired people win it or get it. Why are you still working?

Didier Queloz: [00:00:49] Well, um, well, you know, what happened is there is quite a lot of time between the work you're doing and the time you get the Nobel Prize usually is 20 to 30 years. I got, if you want to say, the chance. And I'm not sure that it was a chance because it was quite, quite stressful at the time to make a discovery, very young in my career, something quite significant. And and it turns out that the time to got such a prize, I'm still into business, so I'm trying to make to make something out of this visibility I have right now.

Jennifer Khakshouri: [00:01:25] So you got the Nobel Prize in 2019 for a discovery that you made in 1995. Can you take us back to that moment of the discovery in 1995, your memories?

Didier Queloz: [00:01:36] Oh, yeah. Yeah, that was I mean, I was at the end of my PhD at that time, and I in my PhD, essentially spent a lot of time building in new techniques and working with a new machine that is able to make measurements of the speed. We call that the radial velocity of stars, and they can do that with an extreme accuracy. So to reach that level, there's a lot of tricks, both hardware and a build up of the machine and also in the software to analyze the data. And that was my PhD. And then at the end of my PhD, we we started the program that was for looking for planets. So why looking for planets with this machine? Because we all want to detect small motion of the speed of the star. And if you find this small, tiny motions, he tells you that there is a planet

orbiting. Well, the expectation at that time was it would take years to do that. So I was not supposed to find the planet at all. I was supposed to just start the program. And it turns out that during the early start of the program, I picked up a strange signal, something awkward in the data on the one star, which is called 51 Peg, 51 Pegasi.

Didier Queloz: [00:02:50] And it turns out that I get a bit obsessed, but nothing went the way I was expected because I saw the value of the speed of that star changing one day after another, one or one night after another one. And it turns out that the only way I could make sense to this data was to consider that there is a planet. But the planet on that star was really a big shock because there was a planet like Jupiter, but not like on Jupiter with more than 10 years to go around its star, our Sun. This one took only four days. And that's how I think we completely changed in a way, the topic, because we announced in 95 that we had detected Michel Mayor was my supervisor at that time. He was not there when all this measurement was done. He came back later. He was in sabbatical. He was quite, quite, quite shocked. I think when I came to him, I said, look, Michel, I think I found a planet. And and then we announced it. And I think nobody believed us at this time. It took a long time.

Jennifer Khakshouri: [00:03:52] Where were you at that moment and what went through your mind? Did you think you were crazy or you thought someone was playing a trick or?

Didier Queloz: [00:03:59] Well, actually, the measurements happened in the south of France in an observatory called Observatoire de Haute-Provence. This is where we had the equipment. So I used to go there every one or two months for a week. So I was in this observatory making the measurement at night. And and for me that was really a lot of stress because that was the end of my PhD and I was not expecting at all such a behaviour. I was expecting all the stars to be maybe gently varying or maybe having nuclear valuations at that scale, because I was only comparing one night after the other one and I really thought that something was really wrong somewhere in the equipment or in my software. And I got a little bit upset because remember, end of my PhD, I say, well, I mean, this is impossible. That stuff I have to find out. And I was even a bit of shame because I didn't want to talk to my supervisor. I said I cannot talk to my supervisor. This is ridiculous. So I have to find the problem, I think is a point when you

can't find a problem, you have to realize that there's no problem at all. You just made a big discovery and that's what happened to me.

Jennifer Khakshouri: [00:05:00] And was it a moment of joy, or was it a moment of irritation?

Didier Queloz: [00:05:04] Well, I must admit, I never felt really a lot of joy into that because it was so awkward. So I felt puzzled. I felt excited by the discovery. But what I found. But I felt also scared because I knew that was something that nobody would respond positively. And it took a long time for me to really enjoy the discovery because it was difficult. Well, after we announced most of the committee were against us, I was very young, very young. So I had my career to build up for my supervisor. That was way easier because he was at the end of his career so he could really have all the visibility and enjoy it without too much risk. I had to demonstrate that I could really be a researcher, not only with one discovery. So so that took me a long time to establish this kind of strength and and to see the discovery as really something that I feel a lot of joy. But I was not really at that moment, certainly not for me.

Jennifer Khakshouri: [00:06:06] And what about when you were in Stockholm and you received the Nobel Prize, was there more joy then?

Didier Queloz: [00:06:11] Yeah, well, when I got the announcement, I couldn't believe it because Nobel Prize for physicists, this is you reaching the Pantheon of the God of the physics. And and you never see yourself like that. I think no one could see myself like that. Stuff like that.

Jennifer Khakshouri: [00:06:25] So you didn't see it coming?

Didier Queloz: [00:06:27] Well, you know, we were aware that we were part of the list, but we are aware almost since the beginning. But, you know, like of a lot of big discoveries. And if I could say the problem of the Nobel Prize, there is only one and there is a maximum of three winners every year. And I do think that is way more people that would deserve the Nobel Prize, that people that could get it. So whether that would be considered as a major discovery for the physics of something I was never so sure about. So when I got the announcement but I've been informed about this, I was a little

bit on the shock because to me that was as if the reality at that point caught me up. And I said, oh, yeah, then this is it. So so now we have it. Oh, my God, this is really how I felt. And I was a bit scared, I must say as well.

Jennifer Khakshouri: [00:07:15] Why scared?

Didier Queloz: [00:07:17] Because going to get the Nobel Prize, this is just absolutely crazy. I think the it's not only about your field, it's everybody's watching you. Everybody's expecting you. Something extraordinary. Everybody is expecting that you will you will speak about everything. And in a way, it's some responsibility. And as as a researcher, nobody is ready for a Nobel Prize. So when, of course, if you are retired and the end of the career, that may be less relevant. But for somebody like me, that's something that you don't know how to handle it, because it's it's it's a big gift. But in a way, it's a big gift that is hot at the same time. So you have to be careful not to burn your skin with it. And that's a bit of a challenge of the Nobel Prize. And so I think I survived the event. I know I know how to handle it and have a nice program to put forwards. So I must say that right now, as of today, I think I enjoy all of it.

Jennifer Khakshouri: [00:08:20] For people who don't understand astronomy like me, how did Michel Mayor and you change astronomy by your discovery in 1995?

Didier Queloz: [00:08:29] Well, if you want to make a comparison, it's about the same kind of story that happened way back when when following. I think Copernicus essentially the scientist in this time, we're really back backwards here and in the 15th century realized that the earth was not the center of the world and it was just orbiting a star, which is our sun. So what we did is something like that. We just demonstrated that our planet is just one planet amongst many because they are other planets orbiting other stars. So everybody was in a way expecting this, but nobody had demonstrated there would be any. So this is what we did. That's what the Nobel Foundation recognized. And they recognized it as a we opened what's called a new window on the universe. And and then a lot of people came in after it, because once you have one, everybody realized there must be many. And actually, I know we have a zillion number of planets orbiting other stars. It's not a question anymore. It's pretty it's pretty common to find a planet orbiting another star.

Jennifer Khakshouri: [00:09:34] And how important is the question whether or not there is life on other planets?

Didier Queloz: [00:09:39] Well, that's a related question that came right after. And that's something we also realized. I mean, we were very proud of having detected a planet, of course, because it was a technical achievement, but we didn't see it coming. I think the emotional related question that comes, oh, then if they are planet another star, there must be life on this planet on other stars as well. And actually, this is a topic which is difficult because this finding a planet compared to finding life on other stars, it's really easy, I can tell you. But that's a topic that have grown since that time. And that's clear that the discoveries of all this planet, on other stars, have acted a little bit like a stimulus push, a little bit this question further down. And people have started to ask this question maybe from different angle. And then recently we have had significant progress from the chemist or the biologist or biochemist and all we want to call them on that topic, what's called the origin of life on Earth. And there is this great prospect that we are going to look a bit more detail what happened in the past on Mars or maybe on Venus as well as that is going to come because the space missions which are being planned or happening right now and this is changing. Absolutely. This question of life in the universe, because it's not only questions, it's a theme of and we have a series of questions related that we can start answering. Of course, we are not going to answer yes or not about that question. There would be a slow process with maybe some some inside here, maybe some small step. But we are clearly moving towards that the perspective to not only be able to recenter the solar system amongst a mini solar systems that exists in the universe. But we are trying to understand life as a universal process in the universe, and that is what we are starting to do now.

Jennifer Khakshouri: [00:11:38] And what do you think about the press releases of the Pentagon that maybe there are UFOs in the sky? I mean, it's further than the sky, but do you believe in the UFOs that the newspapers is writing about?

Didier Queloz: [00:11:50] Science is not the religion. So so you don't have to believe it or not to believe it. It is based on facts. So my understanding of this press release that has been done, that there is no clear facts about this. So I would love I mean, if I mean, if I see really an alien and knocking to my door in my office, I would love to have a long chat with this alien.

Jennifer Khakshouri: [00:12:14] What would you ask the alien?

Didier Queloz: [00:12:15] Whether you're coming from first. You know, we would have to speak the same language. So so even in a country like Switzerland, not everybody's is understanding the language of the others. So so I think that may be a quite of a challenge to understand each other.

Jennifer Khakshouri: [00:12:43] We spoke to a few people now for the series of the stars and the planets to astronomers. And most of the people we spoke to had a strong relationship in childhood to, I don't know, Star Trek or to sci-fi literature. How was that with you? Is this something that you enjoyed or still enjoy?

Didier Queloz: [00:13:01] Well, I would not qualify myself as a fan of sci-fi, but of course, I think I'm part of this population that had the TV when they were young. And of course, I've seen all the classical series and all the movies about sci-fi. And these are great movies, whether this has inspired myself, I'm not sure that it's more a global element about knowledge and curiosity that inspired myself. Certainly when when you see this this this Apollo landings and exploration of the solar systems, this beautiful picture, that is really something that always fascinated me, but always had a more intellectual approach of the problem. And actually, I think what dragged me down to science is by reading a lot of books, a lot of articles, and just by following the news of the science

Jennifer Khakshouri: [00:13:51] Books, not literature. You mean science books? Physics books?

Didier Queloz: [00:13:54] One of the very famous book is this book of Carl Sagan "Cosmos", which by myself, definitely I thought this book is just just wonderful. I mean, this is Carl Sagan is bringing you into the research by the emotion, which is which is something that was very fascinating to get when when when you kids because you get the feeling that science is kind of boring because you see you see only the technicalities, but you realize that this is all wrong. This is maybe some way to see it. But actually, it's like the paintings. You can see the technicality of the painting, but who cares you what you do care about the painting of the art is what is your connection to

the art that you're looking at, looking at or hearing of? The music is exactly the same. So science is exactly the same. So you should not be obsessed by the technicality, but you should just use science as an emotional element that is connecting you better to anything you want to connect around you, which is the global environments. And scientists bring you that in a very clever way based on facts that correspond to very profound knowledge and elements. And that's what I realized when when I was younger. And I think this is what have dragged me to science as a general topic that I wanted to study. And then I went to physics because when I was young, I realized that physics should be the king of the science. And I thought astrophysics would be a cool topic within physics. Well, because I think when you see telescopes on top of the mountain, volcanoes, you see these beautiful side, this beautiful equipments. I think it's pretty cool to work in that environment. And I like the night sky and I just enjoy it. And universe is a lab actually for astrophysics, you encounter The Big Bang, the dark matter, the life in the universe, all these big questions. So I thought that would be something that I would certainly enjoy myself to spend my my life working on it.

Jennifer Khakshouri: [00:16:02] Here in Zurich, you're going to be building a new center and you'll also be in Cambridge with your other leg, so to speak. How is that going to work? Will you commute or will be one semester here, one semester there?

Didier Queloz: [00:16:13] Yeah, I will try to do long, long periods that because it's easy to be for a given time somewhere, doesn't prevent to go back and forth. But I will it will go very naturally because there are they are different periods of teaching. And right now we certainly are very familiar with the fact that you don't need to see the people in person every time there's a lot of communication means that we're already in use before, I think, amongst the astronomers, because when you have people on the top of the mountain in Chile and you want to have a discussions, you use Zoom. We have been using all this before the pandemic's. I know everybody knows these kind of tools. So that would be a mixing of working remotely. Some extend for just keeping the communication channel and spending half of my time in ETH Zurich and the other half of my time in Cambridge, UK.

Jennifer Khakshouri: [00:17:02] Here at ETH, you're building a new center to study the origins of life. Will you be able to research yourself any more or will you just be a manager?

Didier Queloz: [00:17:10] Now, oh my God, I'm not planning to be a manager at all. I think the the centre will be self managed in a way. We will have someone certainly that will be an acting manager, but it will not be me. Now, I think my role is, first I will I will continue to work on the topic that I've already started, which essentially my business is to find the planets and to find what they look likes, essentially. But I think I can also, you know, be some kind of a glue or. I always compare science as it's a fantastic orchestre. The problem of the orchestra, especially at ETH, you have you have an orchestra which is full of first violin and prima donna and singing and there's plenty of people are just extraordinary. So how do you build up something which is not the individual activity of each of them? That's something that together is making the orchestra sound like an orchestra. And that's exactly what I'm trying to do, and I think with my experience and my knowledge now the field, I can help to do that. So I don't know who I would qualify myself. But it's a bit like if you compare the orchestra of being a maestro in a way. So essentially a maestro doesn't do anything but but because he doesn't play really, but he is making the play working. So I think I will see in the center successful if I can demonstrate that the center is working without me. And that's exactly what will be the objective to having something which is completely working and operational and in a way will self constructing its own science. And we will attract bright people, young people, and we will hopefully develop this community spirit and common identity that I'm trying to describe the comparison with the orchestra.

Jennifer Khakshouri: [00:19:05] Is this also what drew you to Zurich, that you have so many people who play the first violin and who are the prima donna and who are actually soloists but sort of need to work together?

Didier Queloz: [00:19:16] Well, these various elements that brought me to Zurich. Certainly, I think ETH is certainly one of the institutions that you want to look for that kind of center because you will find what's called a critical mass or enough people that could really make a difference. So it's quality, if you want, of the people here, combined also with the capability to do it in terms of resource, infrastructure. So that's really key ingredients. And that was certainly the starting point. But that's not enough. What happened as well is I realize that there were people in this place already in various departments that were considering, I think that topic as a topic worth of research. But they essentially were missing a little bit of something to make it work. And what is what

was this something? Some kind of push say, OK, that's great, let's let's do it. This is the resource that we have to start. And this has happened by a long conversation I've had with Joel Mesot. So explained essentially to Joel Mesot the idea that I had and I really wanted to develop that center. I thought ETH could be a good place to do that. I would be pleased to bring this kind of idea to execute it in Switzerland because I was already doing that in Cambridge. And Joel, I think, just loved it. And I thought that is a great idea. And and he made this possible. And I think this is the combination of all of this that is making this center possible.

Jennifer Khakshouri: [00:20:48] Joel Mesot is the president of the ETH Zurich. And this is common knowledge for you and also for me, but maybe people listening outside of Switzerland just to give an idea. You told us that you work in Cambridge and in Zurich, will there be a possibility of collaborating? Will Cambridge and ETH Zurich somehow have projects together?

Didier Queloz: [00:21:12] That is my ambition to establish scientific collaborations. The reason why it's my ambition is first, I think in terms of quality of the research and impact of the research, these universities are very similar. So that would be in terms of intellectual agility, that would be certainly very easy to do. Now, there is also another element which is interesting. I do think that we would benefit in Europe to build up a bit more closer network on some key topic research, the already some existing network. But that network doesn't really exist yet at that level simply because it's easier to travel between UK and Switzerland than to look for collaborations with Japan or with US. We do have collaborations which is much farther away. So let's try to build up with the people we have. And we also looking also looking for for some place in Germany. There are also some centers, existing centres in Spain, in France that will come along the way. But the idea of this centre is to resonate and to be seen as a place willing to work with these other places. And hopefully we should be able to build up a network which is essential for the young researcher, because this young researchers, they need to have a pathway in their career. So they may want to study at one place and then do what's called a postdoc, another place, and then they may find a position in a third place. So you need to build up this many different places just to offer the opportunity for for this researcher to just move around and to build up a career according to their interest. So we cannot be alone on that. This will not work. It's a global program.

Jennifer Khakshouri: [00:22:59] It's a global program. You spoke about Europe, but Cambridge and Switzerland both aren't really in Europe. I mean, of course, they are geographically, but they're not part of the EU.

Didier Queloz: [00:23:10] You enter into the political Europe, this EU, which is which the EU is not Europe, EU is the EU, which is a topic of concern, I think, for Switzerland. And we have seen what is happening right now. I think, frankly, I just learned that what is happening right now with the with the European Research Council programme, I think for Switzerland, this is certainly and certainly not a good deal what is happening. So so we have to find ways and I'm not planning to fix the problem. At least I would try to use my connection with Cambridge to to build up some interesting collaboration and maybe some exchange between the two places

Jennifer Khakshouri: [00:23:45] When you retire we can say Didier was a Nobel Prize winner, a manager, a diplomat and a scientist. Which one do you like best?

Didier Queloz: [00:23:54] I don't know. I'm not sure that you understand the word retirement.

Jennifer Khakshouri: [00:23:59] So you're not ever going to retire?

Didier Queloz: [00:24:01] You know, when you're a scientist I don't think you can ever stop. Of course, you will have to give up your task, your duties, but but you never stop. I mean, look at all these scientists, they keep doing their own. I mean, idea, some are writing books and I mean some are giving advice. And then, of course, they don't have the action of responsibility or managerial responsibility. But, you know, science is a way of living in a way. And so I always say it's amazing that we get payed for that because I feel like an artist in a way, as I'm producing my art and I will still be doing it until my my last breath, I guess.

Jennifer Khakshouri: [00:24:42] Thank you very much, Didier Queloz, for being here at the ETH podcast. My name is Jennifer Khakshouri. I produced this podcast together with This Wachter's audio story lab and with sound designer Luki Fretz.