

ETH Digital Einstein

Digital Einstein: [00:00:03] I do not consider myself a genius. I am just naturally curious.

Jennifer Khakshouri: [00:00:10] In this episode of the ETH Podcast, I have a conversation with one of the most prominent scientists of the 20th century, who also happens to be the most famous alumnus and retired professor of the ETH: Albert Einstein. Is being naturally curious sufficient to receive a Nobel Prize in Physics?

Digital Einstein: [00:00:34] I believe yes. I received my Nobel Prize 17 years too late and for the wrong theory. I deserved the Nobel Prize for my theory of relativity, but I received it for the discovery of the law of the photoelectric effect.

Jennifer Khakshouri: [00:00:50] You are probably one of the most famous scientists in the world. What does the fame do to you?

Digital Einstein: [00:00:55] In general, it doesn't help anything. You get foolish, and people tend to talk to you as if you are a kind of saint, which is not in my interest. And I explicitly didn't want to become this icon after my demise.

Jennifer Khakshouri: [00:01:13] Yeah, right.

Digital Einstein: [00:01:15] I am not the real Einstein. I am a digital character – I like to call myself a chatbot. I am not getting older you see – in comparison to you.

Jennifer Khakshouri: [00:01:25] Okay, fine. Who is impersonating Einstein?

Digital Einstein: [00:01:28] Yes. My name is Patrick Karpiczenko. I am a writer, comedian and film director. I am glad to be here.

Jennifer Khakshouri: [00:01:37] Patrick Karpiczenko is known as Karpi in Switzerland, and now also as the voice of Digital Einstein. Digital Einstein is a 3D-animated character on screen with lots of hair, big eyes and a moustache, wearing a grey tweed suit and a red tie and sitting in an armchair. To have a conversation with him, one sits in an

armchair too, opposite the screen, and then one starts talking. He can see, hear and interact with a person in front of him and answer all kinds of questions.

Marina Krstic Marinkovic: [00:02:09] I was pretty impressed by the technical details that went into this creation. The field of machine learning is something which is advancing, also my field, and it was really interesting to see how it was being applied in the sense of art. My name is Marina Krstic Marinkovic. I have been a Professor of Computational Physics at ETH in the Department of Physics at the Institute for Theoretical Physics since February of this year.

Jennifer Khakshouri: [00:02:41] Marina is not only impressed by the Digital Einstein, but also by the real one – by Albert Einstein. Does Marina remember when she first heard of him?

Marina Krstic Marinkovic: [00:02:52] This is hard to pin down. I think it was far before high school that we actually learned about his theories for the first time. Already back in primary school, I would hear people in everyday life referring to the famous “all things are relative”, and so on.

Jennifer Khakshouri: [00:03:07] Why was it that you heard about Albert Einstein in primary school? Because for me that’s unusual.

Marina Krstic Marinkovic: [00:03:13] Well, it was more in everyday life. But in high school, I was part of the programme for talented students. We had double the amount of physics lectures and maths lectures, so we already got the chance to learn about Einstein’s theories at a young age. And this was where the inspiration started.

Jennifer Khakshouri: [00:03:34] How did he influence you?

Marina Krstic Marinkovic: [00:03:36] His career was somewhat unusual for the scientists of that time. It took quite a long time for him to get recognition for his discoveries, which were made at a fairly young age. And I believe that mostly his persistence and his own belief in his theories – even though the rest of the world did not immediately understand them – are the things that I find most inspiring.

Jennifer Khakshouri: [00:04:03] And was your path also unusual in that sense, so that you can relate to that?

Marina Krstic Marinkovic: [00:04:08] Yes. There is one of Einstein's quotes, which says that life is like riding a bicycle. To keep your balance, you have to keep moving. I have been moving around quite a bit. I started my career after being an undergraduate at the University of Belgrade. I did my Master's and PhD theses in Berlin at DESI Institute and at Humboldt University. Then I moved for several postdocs. I was in England – in Southampton – and at Cern in Geneva. Then at Trinity College Dublin and Ludwig Maximilian University in Munich before I came here. So it was quite a path. And that's why this is one of the Einstein quotes that I find pretty inspiring.

Jennifer Khakshouri: [00:04:54] So are you here to stay now?

Marina Krstic Marinkovic: [00:04:56] Hopefully, yes.

Jennifer Khakshouri: [00:05:00] Marina is here to stay in Zurich at ETH, while Albert Einstein is revisiting his alma mater – well sort of. How did Karpi get into impersonating Einstein?

Digital Einstein: [00:05:10] It was a lucky accident. I grew up with one of the members of the team that developed the Digital Einstein. And he asked me if I knew any writers that could write for a digital character. And I said, well why not me? Then it developed from there, and I did some temporary audio. And that's how I started to do the voice for Einstein as well.

Jennifer Khakshouri: [00:05:35] The ETH spin-off Animatico created the interactive platform with the digital twin of the world-famous scientist.

Digital Einstein: [00:05:43] They built an engine, which they use for avatars – talking interactive avatars – and for this one project they collaborated with ETH to, basically, pull Einstein out of his grave and put a digital AI soul into him and build this Einstein as a physical installation.

Jennifer Khakshouri: [00:06:03] While Karpi created the content and wrote all the texts for the digital Einstein, Animatico developed the tools.

Digital Einstein: [00:06:10] And they let me play. So I fed the system. So it doesn't need me anymore.

Jennifer Khakshouri: [00:06:17] Before Karpi started to write all the material, he dug deeply into Albert Einstein's past. He read all the biographies, interviews, letters, spoke to experts and learned his German accent in English.

Real Einstein: [00:06:31] What science strives for is an utmost acuteness and clarity of concept as regards their mutual relation and their correspondence to sensory data.

Digital Einstein: [00:06:45] It was very, very interesting because I started, like many people, with an idea of Einstein with a lot of clichés and a lot of quotes that were not actually by Einstein. So this was interesting. And I learned a lot about ETH, and Switzerland itself – because ETH is closely connected to the modern country. So I found this very interesting. And, of course, the humour – I connected, of course, with the humour and the irony of the real Einstein.

Real Einstein: [00:07:13] Is there no thinking without the use of language? Has not every one of us struggled for words although the connection between “things” was already clear?

Digital Einstein: [00:07:27] I have carried the character with me now for one-and-a-half years. And it has weirdly developed into part of my brain. Now he lives in me because I carry him along.

Jennifer Khakshouri: [00:07:38] Karpi mentioned that everybody has an idea about Einstein, and his name has become a trademark. Is this helpful for the sciences? What does Marina think?

Marina Krstic Marinkovic: [00:07:49] I think it is hard to answer this question because it wouldn't actually fit in a sentence. Einstein was many things, and there is a part of his

professional identity that many of us look up to. So I would say it is helpful to have such a trademark, but it's also important to look for new ones as well.

Jennifer Khakshouri: [00:08:11] Marina talks about one of the many Einstein quotes.

Marina Krstic Marinkovic: [00:08:16] I came across one recently that says: "To punish me for my contempt for authority, fate made me an authority myself." And this made me believe that maybe Einstein would not agree himself to being such a trademark. Since one of his requests was not to make a museum out of his personal space, office and so on. And I think being humble is also important when making scientific discoveries and when doubting our own ideas, checking them, verifying them and having bullet-proof evidence that they are correct.

Jennifer Khakshouri: [00:08:56] Albert Einstein was considered a genius for many reasons, and all his talents, such as playing the violin, a good sense of humour and most of all....

Marina Krstic Marinkovic: [00:09:07] His theories are ahead of his time somehow. So the discoveries he made at the time showed a great amount of creativity.

Jennifer Khakshouri: [00:09:18] So Albert Einstein was ahead of his time. And after his death in 1955, he missed out on some spectacular verifications of the validity of his predictions.

Digital Einstein: [00:09:28] He would, of course, enjoy all the proof that has popped up over the years that his theory of relativity had predicted. Like a few years ago, we took an actual photograph of a black hole, which his theories had predicted as well. So he would be happy to see that photograph. I think every year there is new proof popping up. So this would be very exciting for him.

Jennifer Khakshouri: [00:09:51] What do you think Einstein would have said about the photograph of the black hole?

Marina Krstic Marinkovic: [00:09:56] Wow, I think he would have been impressed, as we have all been. The whole community was really impressed. And I know of friends

who don't have scientific backgrounds who were refreshing their browsers to see the photograph for the first time when it was announced, and so on. So it really was an impressive discovery. But this is also one of those discoveries behind which was a huge team of scientists. It was a collaborative effort, and many different little pieces were needed, including the AI.

Jennifer Khakshouri: [00:10:32] Which the creators of the Einstein avatar used. Digital Einstein must answer questions brought up by public debates around Albert Einstein, such as the impact of his former wife Mileva on his theories. Do you think your wife, your former wife, would have deserved the Noble Prize rather than you?

Digital Einstein: [00:10:52] No. This is a complicated issue. But many people have asked me about this. Mileva was not instrumental in developing the theory of special relativity. But she was, of course, a huge help to me and to us as a family unit. I later donated the whole prize money from the Nobel Prize to her as a form of compensation for the divorce.

Jennifer Khakshouri: [00:11:19] For Marina it's more interesting to look at Mileva Marić not as a part of Einstein but as an autonomous female scientist.

Marina Krstic Marinkovic: [00:11:29] It's important to look into the role of female scientists at that time, when Mileva Marić Einstein lived. This was also inspiring for me, coming from the same region as she does – from the northern part of Serbia. And the fact that she made this long road to study physics at ETH more than 120 years ago and was one of the top students in her class at the time, the only female physics student at the time, is also very inspiring. And I would like to take this opportunity to recommend the ETH Tours App that looks into the parts played by female scientists. There is a tour that is called The Feminine Side of Science, which is a good first step to look into the contribution made by female scientists at that time.

Jennifer Khakshouri: [00:12:20] Some voices say a genius is a genius, regardless of any gender. So would Einstein have had the same career had he been a woman? Let me ask him.

Digital Einstein: [00:12:32] Great question. Sadly I was not programmed to know the answer.

Jennifer Khakshouri: [00:12:37] OK. And what are your thoughts about equality in academia?

Digital Einstein: [00:12:41] I am sure the real Einstein would know an answer as well. Sadly, I am only an inferior copy of the man.

Jennifer Khakshouri: [00:12:48] One hundred years ago Albert Einstein received the Nobel Prize for Physics. His career was unusual. The Digital Einstein creates access to the brilliant science star and to physics in a playful way. But is he still a role model for young students and scientists-to-be?

Marina Krstic Marinkovic: [00:13:08] The belief that he had in himself is something that young students can aspire to. There was a campaign a couple of years ago in Germany organised by young female scientists, and Einstein's face was the face of the campaign. So I think he is already a role model for scientists around the world. But it is also important to bring in some other faces to this.

Jennifer Khakshouri: [00:13:42] So let's go to some quick questions and quick answers, please. Switzerland or Germany?

Digital Einstein: [00:13:48] Switzerland, definitely!

Jennifer Khakshouri: [00:13:50] Peace or war?

Digital Einstein: [00:13:51] Peace – I am a militant pacifist.

Jennifer Khakshouri: [00:13:54] ETH or MIT?

Digital Einstein: [00:13:55] ETH. It is after all the place where I made many life-long friends.

Jennifer Khakshouri: [00:14:00] Podcast or radio?

Digital Einstein: [00:14:02] Radio. I have no time for long-form broadcasts.

Jennifer Khakshouri: [00:14:07] Then let's jump off the bicycle while it is still moving and make a point here before we create a long-form podcast. You can strike a conversation with the avatar of the brilliant scientist at ETH Höggerberg until the end of the year. And as of February 2022, he will be at the main building of the ETH. Check the show notes of this podcast for further information. Thanks for joining us. The ETH Podcast is hosted by me, Jennifer Khakshouri, and produced by the Audiobande, a joint venture for sound adventures.