



Mischa Dohler

Interviewed by

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17 December 2021

Via Zoom

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Archives of IT

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Welcome to the Archives of Information Technology, it is the 17th of December 2021 and we are recording this interview on Zoom. I am Elisabetta Mori an interviewer with Archives of IT. Today, I will be talking, er, to Professor Mischa Dohler, I am in Italy, in Milan, and Mischa Dohler is in Silicon Valley, California.

[00:00:25]

Professor Mischa Dohler is chief architect in Ericsson in Silicon Valley, he was Professor in Wireless Communications at King's College, London, and is now visiting professor there driving cross-disciplinary research and innovation in technology, sciences, and arts. He is a serial entrepreneur with five companies, he is a composer and pianist and he has pioneered several research fields and contributed to numerous wireless programmes Internet of Things, machine to machine, and cyber security standards and has more than 300 highly cited publications. He has received numerous awards and he is a fellow of the IEEE, a fellow of the Royal Academy of Engineering, a fellow of the Royal Society of Arts, and a distinguished member of Harvard Square Leaders Excellence.

Welcome, Mischa, let's start with a very easy question, when and where were you born?

[00:01:30]

That was easy, I was born in Jena, in Germany and that was the very days of January, the 3rd of January in 1975, so, at the time of recording, I am almost 47 but still 46.

[00:01:46]

Can you describe your parents, what were their occupations, what was your family life like?

[00:01:53]

I-I have, erm, a-a-a-a very talented father, he was a professor in mathematics and information sciences. At the age of 65, he decided to start his own company and in fact, this has really influenced my own entrepreneurial career and I can tell you more about this a little bit later. My father is really somebody who is questioning all the time and he is a scientist by nature, trying to understand the world and I think I've got

a lot, er, gotten a lot from him actually. My mother is equally illustrious, she is a physicist by education, electrical engineer so, half and half and she's erm, she invented a few really important things, such as a SQUID, this is a very small device you use to measure the magnetic brain waves, and er, she was part of a team which has pioneered that field. So, I grew up in a scientific family, right, and my father played the piano as well, and his father played the piano and it went on for generations. So, I was also surrounded by music, so, we're kind of a very mixed family, we like to hike a lot, travel a lot, we all love travelling as a family, so, yeah, it was good, I had a great childhood.

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That's amazing. Have you got any siblings?

[00:03:24]

Yes, I have an older sister, Anita, and, er, she's er, she is also very accomplished actually, she is in electrical engineering, went into telecoms and worked there, for her entire career in telecommunications. She invented Pay As You Go, okay, believe it or not, my own daughter is always telling me I'm the boring one in my family. But my sister invented Pay As You Go, she is cited on the patent there, er, very early on and erm, she is now currently the Chief Executive of NGMN which is one of our largest alliances in the world of telecom, bringing together all the TELCO operators and vendors to define a vision for the next generation telecoms systems. So, that is Anita.

I had a brother, Eddie, we were very close, we were 16 months apart, he was 16 months younger than me, we sadly lost him to brain cancer er, some seven years ago. So, we were very, very, very close and that was a very tough time in 2014 when I lost him. So, yeah, we were three very close together, now we are two, but spiritually, it is still three.

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I'm sorry for your loss. Let's go back to your childhood, so, who were the important influences on you, in your early life?

[00:04:50]

In my early life, it was probably actually, m...my mother, you know, the mother always plays an important role, she wanted, er, us really to succeed, she would spend 24/7 on us, on the education. She got us the best er, teachers she could-she could think of, even just to upskill us from the side of the school. You know I do remember, she engaged with a well-known physics professor, who could teach us really physics, er, she always said, the proper way, okay. And er, and it was fascinating because we... we got a very different view on the sciences and specifically physics and maths for me because I really loved it as a child already but er, but it also gave me that competitive edge actually and I started to see that I was advancing my peers in school. I was in a school which was really specialised in sciences and maths and, er, and-and all that. And er, I was-I was, er, you know, participating in Olympics, in maths Olympics, physics Olympics and started to win them, right, which is--which is a really great feeling and erm, you know, partly because I was very quick in doing things and partly because I understood really deeply in how to do things.

And er, you know I won quite a few Olympics, erm, as a child, when I was like, 15, 16, 17, and 18, in mathematics and physics er, at the regional level, in Thuringia, which is the region I grew up in. And er, also, in physics, I went to the third round of the internationals with Germany, so, er, I had my good days back then in-in sciences. You know, I don't talk too much about it because officially, I have the label of an electrical engineer now, but I did physics you know, to a depth, er, which probably a lot of physics students even haven't done, right, so, integrals, differential equations, I-I've seen it all, done it all and I loved it, and I still love it and, er, it really helped me to really bootstrap my current career.

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So, what about university?

[00:06:55]

University, yeah, university came fast and furious, and er, you know, in Germany, we need to do the army, er, or the civil service, so, at least back then, I'm not sure how it is back then, I'm not sure how it is right now, actually, to be honest, but, er, I had to choose. So, I choose the civil service and I was one year in the construction service,

believe it or not, I was actually building buildings, er, er, you know, fixing roads and, I loved that period. I'm mentioning this because it really taught me hands-on capabilities. So, imagine child Mischa, always doing physics and maths on a piece of paper and suddenly, I'm thrown into the construction world and I became really hands-on, right. So, from-from that moment on, I was repairing everything with, whether that's repairing the car, er, repairing the piping in the house, the tiling, er, the roofing, etc. so, there was a lot of stuff I learned, and I loved it.

And then, you know, I needed to make a choice and erm, my passion was always music, and I wanted to become a professional er, pianist, okay, that is really wanted I wanted to become, and er, the best music schools, you know, you either have them, you know, it's either London, the United States, in New York, presumably, er, or Moscow, right. So, I thought, hey, let me go to Moscow and see whether I could become a professional pianist and then my mum said, "You know, Mischa, think about it, there are 400 brilliant pianists going into the Conservatory, and there are 400 brilliant pianists coming out of the Conservatory and one of them makes it, one of them every year. There is no rule, nobody is better, or worse than the other, they are equally good, erm and the remaining 399, they play at weddings and in pubs and all that for the rest of their career; is that what you want?" And erm, [coughs] she was... she was right, of course, and she scared me off a little bit.

So, I decided to study physics instead, in Moscow actually. So, I did my first two years in-in Moscow, in physics, erm, and then, for reasons relating to my then-girlfriend, er, she couldn't stay longer, er, we-we moved to Germany, to Dresden. I moved back to Germany to Dresden and wanted to start physics there but they wouldn't recognise er, any of the exams I had done, which was really bizarre because, you know, physics in Moscow is a bit like the Stanford of the East, in a sense, right. So, it was this really bizarre moment, I just didn't understand why they wouldn't recognise my physics exams. And erm, and I was really depressed, sitting on the staircase in Dresden, and a good friend comes by and says, "Hey, Mischa, go to the engineers, come with me, let's have a look" right. And I went to the engineers and they did recognise all my exams except technical drawing, I had to redo technical drawing and literally, you know, it is not even a metaphor, literally, I became an electrical engineer overnight, okay, and this is how I really started.

Then I had to take, I remember, a telecom exam, and I tried to talk my way out of this with a professor Fettweis, Gerhard Fettweis. I went to his office and he actually just arrived from Silicon Valley to Dresden, he was appointed there, a professor there, very young. I went in and said, “Gerhard, listen, I have done comms stuff, I don’t want to do your exam.” He said, “Sorry, you have to do it.” So, it was the next day, so, I went just back home, studied a little bit very quickly, went into the exam and erm, in Germany, the marking goes 1, 2, 3, 4, 5—1 being the best and 5 being the worst, right.

And I do remember I was the only one who finished the entire exam and I was the only one who got a 1, so, the best mark, the next best was a 3, okay. So, Gerhard called me the next day when he marked it and said, “Mischa, you’re starting with me in telecoms er, tomorrow” right, so, he paid me a little stipend, and it was really Gerhard Fettweis, who himself, was really, really famous, and well-known in our ecosystem, you should really interview him too. Erm, so, I became a telecom engineer actually, and I worked in er, very early on, on 2G er, and, you know, 1½G, in ’95, erm during [unclear 00:10:46] I remember, then it went to 2G.

I grew-I grew bored of Dresden, to be honest, a little bit you know after you’ve lived in a city like Moscow, it’s er, just very small and I wanted to go to the US. And I missed all the application deadlines to go to Stanford or Berkeley but I thought, let me get a bit closer, and I went, er, and I asked my friends around in Dresden, professors, who said, go to London to Professor Hamid Aghvami, he is the best guy in telecoms. So, I applied there, I-I-I went over, and in 1998, September, er I started erm, you know, my telecoms degree and my-my career in earnest, in telecoms in London, at King’s College, London. And, er, you know, I could tell you a lot of stories around this, but let me stop here, so, this is roughly how my education went.

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But I’m curious, just tell me one story about that if you want?

[00:11:39]

Yeah, I mean so, you know, I-I arrived in London and you know me, I did my master's and erm, you know, I didn't plan to stay as I told you, right, I wanted to go to the US, in fact, I wanted to go to industry, I didn't even plan to do a PhD. But on the second day arriving in London, in September 1998, I met a-a young, beautiful woman, called Gemma Guilera, and erm, we became boy and girlfriend and, er, she is now my wife, you know, we've been together for, well, you calculate it, 23 years, very happily together and she has really been my-my rock and support. And you know, Gemma, did her master's there, she did an Erasmus, she is from Barcelona actually, so, she-she moved over to London for a year and didn't plan to stay either.

But we didn't know what to do, right, so, and then we both got offered a PhD scholarship in London and we said, let's stay at King's College and we just stayed; I did my PhD, I didn't want to do it. Then I-I did my PhD and then Hamid offered me, and King's offered me an academic position, a permanent position, which is really difficult actually, you know to get a permanent position just like that. I got that position and Gemma got a really great offer in France in the particle accelerator industry, in Synchrotron, right, so, she is a chemist, a materials scientist and erm—So, she-she moved to France and erm, we got married in 2004 when all that happened, and then we were kind of almost a year separated, and I didn't like that. I said, “Look, hasta la pasta,” as you say in Italian, and er, I actually quit, I quit King's College, everybody you're crazy, how can you quit a permanent academic position? It's impossible to get that. So, you know, love is bigger than that so I went to France Telecom and then a completely new chapter in my life started. But from an educational point of view, this is what happened until about 2005.

[00:13:32]

So, what happened in 2005, what did you do in France?

[00:13:35]

Yeah, so, you know, France Telecom and I still remember, I didn't speak a single word of French [laughs] and, eh, I put it on my CV as we so do. I could say, bonjour and stuff like this, and order my coffee in a coffee shop, that is about it. I remember Dominic Bartel, who was interviewing me, starting in French right, because he

thought I would speak French and we quickly had to switch to English. They were so wonderful, so kind, and it's in Grenoble, it wasn't France Telecom in-in Paris, it was I Grenoble, and er, in the Alps. It is a beautiful nature environment and for me though, it was very difficult I have to say because I'm a-I'm a real urban-urban boy, I like people, I like coffee shops, I like clubbing. I think that we went out in London, or I went out in London, every single day for seven years, seven years I lived from 1998 to er, 2005, every single day, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, so, I was reliving London to the limit. Er, you know I had a little flat in Soho, which we shared with my wife until you know, she went to France. And it was crazy, it was wonderful, you know, London has such an energy, I mean, you know this.

Then I arrived in Grenoble, it is all nature, you know, birds singing, stuff I hadn't heard until then, very much. It was a big change, it wasn't easy for me I have to say, but you know, thanks to my wonderful colleagues as well and my wife, it was a great time. And erm, and erm, we-we did, erm, you know, from all the things we did there, well, apart from that I learned French, which I am very grateful for because now I can navigate my way through France and I really started to appreciate the French culture, you know and I think it is a great country. It's one of the under-appreciated countries in Europe, I have to say, so, once you speak the language, it is a completely different environment, it's just really wonderful.

The one thing we did technically, is really that breakthrough in the Internet of Things world, so, very technical things. Erm, we kind of realised that a lot of people talked about this as a future concept and we said, hey, let's start building a standard around this. And our world works in standards the reason you can take your phone today, which was produced, er, designed by Apple in California, produced in China, sim card in the UK, you're in Italy calling a friend in Buenos Aires, this all works because we have standards. And erm, we wanted the Internet-the Internet of Things, so, the things world to be equal, right. So, if you wanted to connect from things in your household and industry, we needed a standard. So, I was one of the three kind of co-founding members, there is Dominic from France Telecom, and Jeffrey Frazier from Cisco, the three of us really kicked it off. And erm, back then, was called ETSI M2M, it is still there, it is one of the standard organisation, it has evolved into 1M2M and

has really powered the thinking of a standardised IoT industry ecosystem over the year to come. Back then, we didn't know and that is really fascinating, with hindsight, er, we realise we have really pioneered something really, really big there and at that point, it was just a normal 9 to 5 job, right, you say, okay, let's do it, let's do the, er, documentation, let's go in and let's get the ecosystem going and start writing the first, er, standard spec that's contributed to the first security specs of the IT. So, er, but with the... You know look back, you know [coughs] 15 years and, er, you realise that this was probably a very, very big piloter, a pivotal point in the development of the Internet of Things, right. So, that was my big memory of-of that time.

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And then what happened in 2008?

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Erm, what happened then, that's a good question. Erm, Gemma was offered a job in Barcelona in the, er, particle accelerator there because they're building it from scratch, right. So, I quit France Telecom and I quit the second time for her, okay, so, we are currently two zero, er, in favour of my wife, right, so, I quit London for her and I quit, er, France for her and I followed her to Barcelona. Er, I was offered a job in CTTC, which is a-a research centre there dealing with telecoms and erm, you know, it's a great place, we had, er, great colleagues doing a lot of research, and it was just a good time. Erm, in erm, but really, what I remember this time for is where-where we co-founded er, Worldsensing, right. And, er, and again, it was one of these moments, I remember, you know Ignasi Vilajosana, Jordi Llosa, and Xavier Vilajosana walking through the doors of CTTC, and you know they were three small kids, right, and talking about, "Hey, Mischa, let's do about-something about IoT" and I said, guys, let's do it.

And they got to know that I was very active in the IoT world in France Telecom, but I also told them that everybody still PowerPoints about it, right, so, and that's what we engineers sometimes like to do. We do a lot of documents and thinking of strategy and nobody actually does things, but at the end of the day, if you want to... If you want to really change the world you need to build things, right. That's what Steve

Job-Jobs did, you know, people built things. Erm, and I said, let's do it and we started. We founded this company in, er, 2008, I think we started talking end of 2008 and we founded it 2009 officially, so, I'm one of the four core founders. I became the CTO of the company, really defining strategy, international projection, and all that.

We really became like brothers on the way, so, some entrepreneurship turn very sour on the wave of we have stuck together, it is a very, very ethical group. It is very difficult to find people who are truly ethical until the end of the day. Nobody screwed anybody over, everybody helped each other to grow Worldsensing. And erm, we have become really a powerhouse in IoT, one of the biggest companies and specifically the industrial IoT. We also had a smart cities initiative; I can talk more about smart cities if you want to. But really, I, er, you know, Worldsensing, it started as a small thing, tinkering on the table and now, is a company which employs more than 100 people around the world, er, really highly valued, er, very you know, a solid engineering company and Ignasi Vilajosana was the current, er, the co-founder, you know, I call him my brother, in-in spirit in that. He-he is still there and he is just a phenomenal person, really phenomenal, maybe also worth interviewing, to be honest. Erm, and of course, I am not officially involved anymore, not least, because I started now in Ericsson, so, I can't, I had to step down from all my company positions. But the journey has been absolutely fascinating, fantastic, and I think is an inspirational story to all European entrepreneurs that you can really make it if you want to.

[00:20:27]

Yes, also, you are anticipating one of my questions about smart cities; smart cities, what would you like to tell us about?

[00:20:36]

Yeah, so, smart cities is a fascinating topic on its own, you know and we actually, back then, I-I remember we were talking to Barcelona because we started tinkering around with the sensors and we-we were trying to find an application for that. And then Ignasi and I, er, and Jordi, er, and Xavier, we came up with this idea of er, putting sensors into parking places out-outdoors, right in the streets of Barcelona to measure whether a parking place is occupied or not. And we saw this as a dual

purpose, right, so, the first purpose is, you would, er, it's very difficult to find parking in, er, in Barcelona, presumably, like London or in Milan.

So, the first purpose was to do a smartphone app for people to see in real-time where there is parking space and route them to this, er, instead of them doing 10 minutes circles in the city and polluting a lot, we would actually route them straight to the er, to the parking place. The other use is that the erm, er, the city hall would know if somebody has paid or not paid, right. So, if somebody parks and doesn't pay, er, then the city would know immediately and essentially er, be able to find the people, etc. So, we had this dual purpose and we called it smart parking back then, so, we kind of pioneered that whole notion of smart parking. Erm, and we started to talk to city hall and they said, "Look, this is really interesting because we are now talking about making cities more intelligent and erm, we thought of calling this kind of smart cities." So, the whole notion of smart cities came out of this and Barcelona wanted to organise a congress in Barcelona at the site of the Mobile World Congress, right. So, now, a telecom industry mobile congress, the biggest event happens in Barcelona, it brings a lot of economy, visibility, branding. And they wanted to do the very same thing for-for smart cities.

So, we said, we told them, let's-let's organise a-a smart cities congress, right, and erm, literally, that was with a town official and, er, with Ignasi, myself, and we were, at the beginning, the first year, we had 10 companies, I can't remember, we were one of these companies there positioned in that. And now, it's a gigantic event which essentially, is really with a global brand and it started with the town hall and Worldsensing back then in 2009/10 if I remember well, when we started that.

Yeah, it's a difficult market in general, you know, it's probably a little bit over-hyped because smart cities is mainly used by marketing departments, but I can tell you, the operational departments in the cities, the ones who are responsible for parking machines, traffic lights and all that, they are interested in making their business more efficient and effective. So, but also, what we realised is that every city is different, they have character, right, they have a different history. Milan is different from Barcelona, from London, from, er, San Francisco, so, therefore, to build a truly global scalable business like we know in IT and software is just not possible with smart cities

business. So, therefore, er, Ignasi decided to sell our smart city business in the end, a few years back and we now focus purely on-on industry. So, that is just a wrap-out on that, er, you know, history on the smart cities from 2010 to today.

[00:23:47]

Okay, so, what brought you back to London in 2000 and er, 2013?

[00:23:54]

So, I got a call from er, King's College, you know, and Hamid Aghvami, who is, er, my doctor father, as we call it in our domain. He was retiring or he was thinking to phase out slowly and he said, "Hey, Mischa, you know, would you be interested in erm, in coming back to London and take over the Centre for Telecom Research?" And erm, I thought about this for a very long time, precisely 10 seconds, and I told him, "Yes, definitely coming back" you know, I just love London. You know, you can turn it as you want, it's just a great city. And I have to say, in Barcelona, we're perfect, right, our in-laws-my in-laws were there, Gemma's parents, er, you know we had-we have a huge set of friends there, great living conditions, beach, mountains, you know, good food, weather. Erm, you know, our two daughters were very happy there, er, but still, London is so gravitational, I couldn't say no.

So, I-I was offered the position of er, professor and, er, because it's an appointed position, er, it's called Chair, er, Professor, so, I was Chair Professor in Telecommunications, I took over the Centre for Telecom Research. And er, back then, maybe we were something like 100 people, so, and my ambition very early on was to really grow that centre, okay, I really wanted to grow that centre. I wanted to- to really deal with a gender imbalance we had and the neurodiversity. And I also wanted to really make use out of London, right, with the strength of London, what is really core to London we could use to put us onto the map? And, er, I was really after very, very big, and global impact, erm, in-in telecoms, in soc-society in general.

And er, you know, with hindsight, looking back now, these eight years, I have to say we-I have achieved that, right. So, the centre grew under my leadership to almost two hundred people, who were involved in various aspects of telecom. I have achieved almost a gender balance, so, it was not exactly 50/50 but, er, at my tenure we were

something like 45/55, so, I really beefed up the, er, the gender balance which I am very proud of. And I've always argued that this gives us a very kind of natural diversity, which indeed has proved to be very, very good for-for a lot of very difficult projects we had in the industry.

And I've also leveraged, really, London, you know, what is London really good at? I mean, if you think about it, London is great in the arts, right, media arts, it's really the bubbling thing there-there are two powerhouses in the world, it's London and er, Los Angeles, right. And erm, I also leveraged on our, on our connections to health. King's College, London owns four hospitals, one of, some of the biggest hospitals in the country and, erm, I was always thinking how can we combine health in technology, having this health firepower in-house and that played out really well, we've done that really well.

Er, transport is a big topic in London, right, so, whilst things do not always work, those who live in London, they know that there, it-it is a difficult city to manage and we engaged with, er, Transport for London, with Heathrow, er, Network Rail, so, we have executed on that. So, you know, I-I basically had really, I think, this interesting job, er, this challenge of not only doing a-a personal professional contribution, I wanted to do something from the Centre's point of view, from the King's College point of view at a global scale and I also, at the same time, became a manager, right, so, not only a leader in the field but also a manager of people and you know, managing 200 people taught me a lot of things. And, er, you-you know, and that was a really fascinating journey for me personally because I really felt I have grown as a person and as a personality whilst doing this leadership in management.

[00:27:48]

Sounds great. And, er, since 2016, you are also on the advisory board of Ofcom, can you tell us more about Ofcom and your roles?

[00:28:02]

Yeah, Ofcom is the er, UK regulator for anything you can think of, media affairs. And erm, I was appointed to the Spectrum Board, and it's, er, I think quite an important position really because we, the board, the Spectrum Board is helping

Ofcom to understand what is currently happening and will happen in the future, all things related to spectrum, related to technology. And erm, you know, we, as a board, we-we, I think we have a lot of influence on how Ofcom really runs internally, what type of procedures it does, and I think we have; specifically, I think I personally had, and I was pushing Ofcom all the time, you know, to-to make sure that we-we look into this-this aggregated future in the spectrum world, how can we manage this better, and it is coming, yes, or no, erm, and we talked about this a lot, what technologies are available, what are the risks, what are the benefits, you know; who profits, who loses?

Erm, I have also been... We've also been discussing a lot, the internal operations of Ofcom, right, so, it is really important to understand that Ofcom has a huge influence on the innovation ecosystem. So, in essence, their regulatory output influences innovation, but the big question I always ask is, you know, who is actually innovating Ofcom? Because you really make sure that the institution which does actually impact innovation also needs to be, er, you know, kind of innovated. And erm, you know, I'm not sure whether that is, er, er, because of me or because of our discussions, but there were some er, big structural changes within Ofcom, which really made sure that they're more innovative proposals made it into the, er, production pipeline of Ofcom.

So, you know, I maintain that argu... Er, this relationship still, and of course, you know, we are trying to tell Ofcom really what are the worries in industry, you know, how can Ofcom as a regulator help? So, therefore, I think that is a really important role and erm, which I am continuing now having just landed here in Silicon Valley and er, I hope I can make further contributions to the wellbeing of the UK and globally, of course, because your Ofcom is really visible. I would argue, you know, it's always kind of number 1 and number 2 with the FCC, which is the US equivalent. Er, but Ofcom has been doing things, you know, which FCC hasn't been doing and the other way around, so, it is a very innovative, forward-thinking buddy, erm, which, we need to understand is, of course, constrained by a lot of legal things, so, I think they are doing the best they can do to really outreach and absorb, erm, intellectual firepower from the-from the community, yeah.

[00:30:36]

And erm, what about Moving Beans?

[00:30:42]

Oh, right, so, the, er, you know, the-the interesting thing is with my entrepreneurship career, it is really that I had done so far only B2B companies, right, business to business. So, basically, the product which you sell onto to a business, er, that would sell it onto another business or to [unclear 00:31:03], so, that is what I've been doing. I knew this pretty well, how to do it, you know, or, how not to do it actually. But, er, the consumer side always fascinated me, and er, I wanted to get this experience from the consumer side. So, we had er, with Gemma, and Dan, we had a coffee, you know, in the back yard [unclear 00:31:22], I was doing another project actually and we were just having coffee, kind of debriefing what we could do.

We realised that you know, drinking this Nes-Nespresso, we drink the Nespresso, er, that actually, it-it's terrible, the environmental impact is terrible because you've got these aluminium pods, with, er, or plastic pods with aluminium sealing on them, or aluminium pots with aluminium sealing, for a little bit of coffee and people were drinking like three or four of those a day. You scale it down and look at the numbers and we were horrified in the UK alone, every year, at that point, there were more than a billion aluminium capsules really thrown into-into the landfill. And they decompose over 500 hundred years, okay, so, if-if Shakespeare er, h-h-has a- had-had actually a Nespresso at his time, he was writing The Tempest or whatever, it would-it wouldn't have decomposed still until today, right. So, this is what we're talking about, the-the environmental impact is just, er, is just terrible.

And then, you know, Gemma being, er, my wife, you know being a-a materials scientist PhD in chemistry from King's having worked in materials science in the synchrotron, you know, pioneered a lot of the catalysts for cars, so, she had a lot of experience in the, in the material world. Dan is a mechanical engineer from, er, UCL, so, a lot of experience in doing moulding, high-pressure moulding, and me having a lot of experience in business we thought let's do this, right, let's just get together. So, we started to test the waters with the market, we first imported some stuff from Italy, er, tried to see if there is a product-market fit if people actually would buy this compostable or biodegradable material, and er, we realised there is, right.

And then we started to develop our own material, okay, we are currently in the process of that, we've patented this, we've got investment, er, Gemma, is the chief executive, Dan is the CTO in a sense. So, we-we are-we have kind of really grown [unclear 00:33:14], but it's a company which I think has a lot of future worth in drawing 3X, so, 300%, 260% year on year on average, right. So, it's really growing very quickly, and er, we hope we, are really going to make a huge environmental impact and the-the solution we have to date if you go to Movingbeans.com are essentially, er, compostable capsules, and the magic in compostable capsules is to make them such that they are not oxygen perm-permissible. Once, you know, if you have a material like I have this paper cup in my hand, erm, you know, it is-it is compostable, it will compose-decompose very quickly. But if you seal it, er, oxygen can come in; if oxygen comes in, the coffee becomes stale and we wanted to have something which is you know, really top quality, Nespresso-Nespresso quality, erm, it is really good to the environment, and it is affordable, right, we wanted the affordability, we didn't want to have a super-premium, where you pay one pound or one dollar, or euro per capsule, we wanted something which really would scale.

That was our company mission and I think we have achieved that. We are very, er, er, economically, very competitive solution which works really well. People are very happy, you go on our, er, review, and they are genuine reviews, people are happy with our coffee and that is really great. We are expanding now, the team is expanding, we've expanded into Australia and Hong Kong, er, we are now expanding into Germany and Europe, and of course, you know, once we've settled in and we get all the permissions, we're looking to expand to the United States nationally, right. So, Gemma will hopefully be taking over that-that-that ambition, it will make a really big change hopefully, mm-hmm.

[00:35:03]

Amazing. So, you are also co-founder of Sirius Constellation. er, since 2000, November 2017, er, so, it is a different project, would you like to tell us a bit more about this?

[00:35:19]

Yeah, it's a-it's a very, very... It's on the very other end of the spectrum, right and, er, we kind of, er, Malcolm Glaister is the current CEO, we met through, er, some of the other board stuff we're doing. And erm, we kind of realised there is a real opportunity to use artificial intelligence plus situational awareness, er, to really give a real-time situational advantage to er, to industry, but also to government. And that is the-where I got really fascinated because I thought, you know, I've done B2B, at that point, I was starting B2C, so, er, business to consumer, but I hadn't done business to government, right, so, the B2G was really interesting, it is a very different sale cycle, sales approach, and all that. Erm, so, we co-founded that company with Malcolm, and er, David Willetts, who is actually... He was our science minister, er, you know for many years, and very much loved and er, he helped us a lot to formulate the industry, the government proposition.

We co-founded this company and it is now called SiriusInsight.AI, that is really where you find the information. Erm, of course, I had to step down again now because of Ericsson, but er, you know, I was the CTO of the company, um, and the idea was really to take, um, commoditised satellite images, which would come from Airbus and all these satellite constellations, um, fuse that with on-on the ground radar and-and-and-and other visual images, er, run AI on top and start building situational awareness, which could be very good for national security for maritime wellbeing, er, you know, to check essentially whether anything fishy has happened in the waters around the world, some sanctions have been broken.

So, that is the type of, er, of proposition we have, and of course, also offering it to insurance companies, maritime insurance companies so they get a better picture of what the ships they're insuring have actually been doing. Have they been going through very dangerous territories; have they been going through storms? Erm, you know, things they wouldn't normally tell them, we would give them that real-time information er, so, they could adjust the insurance quotes. So, it's a really fascinating company, very difficult, right, so, I don't want to lie here, it is very difficult to-to get the right skillsets of people to rebuild the product. It is very difficult to get into the-the trusted environment of the government, but erm, I trust Mal-Malcolm, he is a great CEO, very passionate, er, and I'm sure that company will also be a roaring success.

[00:37:54]

Now, let's talk about your current interests. Erm, can you explain, er, what is The Internet of Skills?

[00:38:04]

So, the-the internet has always fascinated me and erm, you know I always thought... I-I didn't want to just design a little piece of the puzzle and specifically, in wireless, you know if you think about, it's just a, you know, an ethernet cable, it happens to be invisible and has a lot of really nice features, but it's just the creativity piece. I want to... I was always fascinated by what we do with that and I looked at how the internet has evolved and we have-we have really succeeded in putting in there which connects now with an ethernet cable, the optical fibre cable, every single supercomputer, and computer on the planet.

Then we went on and we started to build the mobile end of it, right, so, the internet, which essentially is connecting our untethered devices, er, we do have, erm, you know, we had 2G, 3G, 4G, 5G and now we are also starting already to look into 6G, so, that happened. After that, you know, we were wondering what's next, what else can we connect? And we said-we said hey, let's connect, er, things, so, we designed the things internet or the Internet of Things as known. And er, I was wondering, in 2014/15, you know, what is the next internet and I realised that we haven't done enough for us humans.

And I thought let's-let's build an internet which would democratise skills the very same way as the, er, the previous internet has democratised information, right. So, today, we can speak over Zoom, we can learn things, we can transmit emails, read news, and all that. But we can't really-I can't really touch through the internet, I can't move an object, I can't play the piano which is behind you. Erm, and I thought, you know, if we are able to democratise that, that would be fantastic if we could enable this, right. It sounds like a completely crazy idea but you know if you told a person in 2010 that they wouldn't need a DVD anymore, and would actually watch Netflix on their mobile phone, they would have said, you are crazy, but it has happened and we have predicted that.

So, I went on the quest to build an internet, which allows us to transmit touch and muscle movement through the internet and 5G was one of the puzzle points but we needed more, we needed robotics and devices, haptic devices, gloves. We needed standards, very important, we needed the MP-MP3s or the Mpegs for-for touch and-and for-for muscle, right. We-we had it for music and video but we don't have it for-for these ones. So, I co-founded a standards initiative to do exactly this, so, I took care of that one. Then we needed artificial intelligence to do a lot of prediction to make sure we are able to beat the speed of light and all that, so, you know, putting pieces of puzzles together, and at the same time, talking, for instance to [s/1 00:40:44 Procca] who is a pioneer in robotic surgery and say, "Hey, how could we apply that notion of the Internet of Skills to his world?"

So, he could be sitting in London and operating a patient to somewhere else in the world, right and-and we kind of pioneered this whole notion of 5G robotics and erm, really started to give the industry a-an inception, an inspiration on what could be done with this technology. But yeah, in essence, I would like you, Elisabetta, in 2030 or 2040, you know, to-to maybe, er, you know to do something you're very good at. If you're good at painting, you can teach anybody in the world how to do it, and not only on video but actually with touch and muscle movement, you know.

[00:41:26]

It's very fascinating, what do you think are these issues related to this? I'm thinking a lot about cybersecurity maybe, this kind of thing.

[00:41:37]

Yeah, so, cybersecurity is a-is a real issue, you know, it's an opportunity, er, but it is also a threat. So, I think any engineer will tell you, any engineer skilled in the matter is that we will-we're not able to build 100% secure, er, er, you know building internet er, construction, it's not possible. So, what we are really trying to do is just to push up the security capabilities. So, we're talking now about zero trust architectures so, where each constituent which participates in the internet, essentially, is not trusted by anybody else, so, their protocols currently are being repositioned to help with that, right. So, how can we have a future internet where security is really at a much, much

higher level? At the same time, we also need to learn to work better on a response plan, right. So, if something goes wrong, what is plan B? And I think as an internet community, we have never really thought about this. The infrastructure is not really geared towards dealing with the problem that you and I know, doing an interview, and suddenly our connection cuts because there is a problem with fibre from Milan to Silicon Valley, you know, it's our problem. But there actually should be an infrastructure solution for that, so, we are not ready yet for these types of situations. So, therefore, it is both increasing the security capabilities, er, preparing for the quantum age as well, there are huge challenges with that, also, opportunities, but challenges, and at the same time, also work on the response plan. So, and you have to write... We need to bake this in from Day 1, not like a patch later on.

[00:43:16]

And erm, it's erm, it's a slight change of subject but not really.

[00:43:23]

Oh.

[00:43:23]

In 2020, you said in an interview to [s/l Rise 00:43:28] that 5G is both boring as well as super-exciting, so, what about 6G?

[00:43:37]

[Laughs] it's probably the same, I have to say, right. So, our industry is both-both boring as well as very exciting, so, you know, let me quantify that or quan-yeah, quantify this. So, I mean the-the boringness really comes because it's kind of, erm... In engineering work, we have to do and we know it will go, okay. So, if you look at how 2G, 3G, 4G, 5G, and 6G will develop and has been developing, it always follows a, er, you know, follows a fairly linear trend in-in logarithmic scale, you know, we are always improving something by a factor of 10 or by a factor of 100, okay. So, if you have 5G now, I have 5G here in Silicon Valley, I have a, er, you know, an-an average, probably something like a gigabyte per second download, okay, a-a gigabyte. In 4G, it was maybe you know, something like 10mg okay, and maybe it averaged around the world at 5G at 100mg, let's go with 100mg download. In 4G, it was, er, 10mg, in

3G, it was 1mg. So, it is always by a factor of 10, so, you know how 6G will play out.

And that is what I mean with the boring thing because we know what will be there, we still don't know why, we don't know how, but we know it will be there, right. Now, the exciting thing is what you can do with that. And erm, 5G had, I think two very exciting developments, so, one is an internal development in that in 4G, you know, everything was done in boxes, and we called this monolithic code so we had programmers around the world, would be sitting on top of one million lines of codes. If you wanted to change something, you had to go into these million lines of codes and change it, it was very lengthy because you have to look at security and all that.

So, in 5G, we have [s/1 sauterised 00:45:20], so, everything works in small software functions, so, it's much more nimble. So, if for instance, you get [unclear 00:45:26] at the same time and the software functions will just talk to each other, it's called microservices, okay. So, we have essentially, er, enabled innovation within 5G which will be consolidated in 6G. So, we will be seeing many more smaller companies appearing, larger companies accelerating innovation, so, this is really exciting within the 5G moment.

Then the other thing we included with 5G is the lower latency, okay and that is that feeling of immediacy. Why is that so important? And it is important because our human brain is really geared to a very low latency engagement, okay. So, erm, we get, er, emotional stimulus from people in the room, er, you know, it's a very different relationship from me talking to you over er, Zoom, versus you and me being in the same room. And the reason is because anything that arrives in our, er, cortex within 10 to 20 milliseconds, stimulates that, er, feeling of immediacy. You bundle this with full immersion, maybe with some AR or VR, and suddenly, you can reproduce physical environments. I call this, you know, synchronised realities, we are literally synchronising our own realities. Erm, and it doesn't happen with Zoom and Teams, you know and that was one of the shortfalls of the pandemic, whilst the IT world has provided, you know, er, productivity around the world, we could still continue working, we lost that emotional bond, right. And we see that with the kids with, er, with the emotional problems they have, and it is really because of this latency thing,

5G allowed us to do that and we demonstrated that with some of the world's first, er, fascinating use cases, where I would play the piano, we did some stuff at the Transport Industry, we did stuff with other arts-arts [unclear 00:47:13]. Yes, a lot of use cases, we just wanted to show the power of the immediacy and 5G is the beginning.

And then, 6G, you asked the question about 6G, you know, every generation, we use essentially, to consolidate what we have done before, so, 6G will be doing things better than 5G, erm, it will also allow us to design completely new services. People talk about augmented reality, we can't really do this in, er, 5G really well, so, we can only do that in 6G. And my personal opinion is really that 6G will probably also empower a lot of machines, so, AI and erm, we will have a lot of new traffic from machines going through the networks and that-that is really something I think 6G will be for. But you know, interview me in 10 years again then we'll see where we are.

[00:48:01]

Thank you. Erm, you have slightly anticipated this, but erm, let's go to the real question. So, you are also a pianist and a composer and on the 22nd of June 2018, you also performed the first 5G distributed concert with your daughter. So, what motivated you, and what was the experience like?

[00:48:30]

Er, it was... The-the experience, how can I summarise that? Whilst I was playing the piano, I struggled not to cry, okay, I'm just telling you the emotional level I was in when doing that performance, right. So, to zoom back now a little bit, we kind of built this... Probably the UK's very first operational 5G system with Ericsson, right, so, Ericsson was really very instrumental in this and this is probably also the reason I'm here because we-we started to develop a very close relationship at that time. And er, my team built all the wrap-around this, so, the software, the-the codex; it's very important, people forget that. Okay, you have a network which take one millisecond to transmit data, but then you have a Zoom video recorder which takes 160 milliseconds to encode the data, so, it's not very useful to us, right. So, we needed new-new codex, and we-we used a guy called Alex Carod in-in Germany to develop- to give us these codexes.

And then we thought, hey, you know, I mean, just doing this, showcasing this, like things are being done in the Mobile World Congress that people will not understand, and I call this giving technology a soul. We as engineers, we need to learn more on how to give technology a soul and literally embed it into something which society understands. And er, and we thought, you know... And in-in fact, this was really the brainchild of Ali Hosseini, er, who hired into this and quite a well-known, world well-known artist himself. And he said, "Mischa, look, you need to do something, which is very emotional" and erm, we decided that I would fly to Berlin, er, and Ali had great connections into the whole Berlin arts scene.

And so, I was literally, with a piano under the Brandenburger Tor, which is a very historic er, you know location, and my daughter, Noa, was er, in London, in the Guild Hall and the Guild Hall itself is hugely historic. And in fact, it's the world's, er, UK's very first entertainment venue, er, the Romans brought that 2000 years ago. And the Romans, as the Italians know really well, how to enjoy life. So, that was their, er, contribution to London, one of them, presumably. And we thought why don't we marry this, er, very historic venue with this very modern technology? So, Noa was there, Noa is erm... I can tell you about Noa a little bit later, she is a fascinating person on her own.

But, er, so, Noa was there, and erm, we sang, you know, I did a cover erm, of an original Kiss song, erm, called "I was Made for Loving You" right. So, "I was Made for Loving You" is a beautiful Kiss song. Maria Mena, er, a Norwegian singer, I believe, did a cover, a guitar cover of this, and I made a-a piano cover on her cover, right. So, we had the song and the challenge was really to get this in synchronicity, this immediacy was so important and if you look, the video is on YouTube actually, and the Financial Times and, it had a lot of press coverage back then. Erm, you know the-the synchronicity is phenomenal, we are 1,000 kilometres apart, daughter and father, are 1,000 kilometres apart, different geographies and we are connected as if we are in the same room. Noa is adapting in real-time to the pitch of the piano, and me to her singing speed. And I tell you, I was playing; you-you can see on the video, my head is down because I was literally tears of emotion were coming out whilst I was playing with my-with my own daughter there. It was fascinating, we wanted to show

the world the power of 5G, right. So, we wanted to-we didn't want to talk about slicing or you know, edge cloud you know, what technicians... We'll really show it, this immediacy, this-this er platform capability. And 5G now, is in-in many countries, we can do this today, musicians can practice around the world without needing to hire very specific fibre. So, that is what we did and we really started this low latency music distributed, er, technology concept.

[00:52:34]

How old was your daughter at the time?

[00:52:37]

So, erm, you do the maths, so, this was 2018, she was 11, 11, yeah, yeah, Noa was 11. You know she is a-she is, erm, er, y-y-y, she always loved singing and she is a-a her dream is to meet Billie Eilish and you know. And she pressured me a lot actually to move to Silicon Valley because we are within spitting distance from er, from Los Angeles now. But in London, she was part of a-a-a choir, which was led by some fascinating people really and, er, you know, they were really high quality, I'm not sure they were the best in the world, but a really high-quality, er, er, choir. And they-they were often called into the, erm, er, Royal Opera House, so, Noa would sing a lot in the Royal Opera House, literally, you know, every-every second week, we-on average, she would be on stage in the Royal Opera House. It gave her all that stage experience, she loved it. Erm, and-and she sang with Madonna as well, right, so, Madonna, Madam X, when she released Madam X, erm, some very few kids were selected and er, sang with her. So, Noa was with her on two songs of Madonna.

What else, er, Last Christmas, the Hollywood movie, you know, er, she sang there as well. So, she had this exposure to the really triple-A arts world and she-she just really loved it. And erm, and that's why I knew she could do it, right. So, imagine a child, 11 years old, and with all the press in the room, with all the people there, the pressure, the technology actually really not being very stable. Sometimes it would work, sometimes it wouldn't, but she kept her nerves and erm, she produced, you know, a really stunning performance er, for us there and er, I'm really proud of her, so, she is-she is just phenomenal.

[00:54:20]

So, would you like to talk about your family?

[00:54:24]

Yeah.

[00:54:25]

Yeah?

[00:54:27]

Yeah, I'm happy to do that. So, you know, you met Noa, my, er, my older daughter and er, you know, she-she is very keen on, you know she's [unclear 00:54:36] subject matters as well, she wants to go to Stanford or to Berkeley, that is her dream, so, you know. And she was focused, laser-focused at the age of six or seven, and it wasn't really us telling her anything about this, but she knew about Stanford and Berkeley from a very young age and she is working her way up. So, she was-she is very driven in that sense. And erm, and then Dahlia our younger one that was born in, er, Barcelona, she's erm, she's an artist as well, you know, she loves painting, um, and she's er... I call her my little quantum girl. So, she has a-a-a great and brilliant creativity, she really combines very different areas, er, put together very strategic, very forward-looking, really understands how trends work and erm, asks really good questions, right.

So, D-Dahlia is my little girl and you know, she loves horse riding, so we've got now, a horse-riding place for her here in-in Silicon Valley. She loves karate, she's now going onto her black belt and er, you know, she's er, she's er, really switched on. And erm, they actually love the schools here, in-in the US, you know, we weren't sure how it was going to play out, it's always a worry for parents when you do these big moves. I've done eight moves; country moves in my life but this was probably the biggest we've ever done. And erm, we end it now, here in-in Silicon Valley, they love the schools and er, really love to go to school, which is great, er, they're starting to get friends, er, which is also good.

My wife, Gemma, you know, she's my-my-my backbone, we have been together since 1998, erm, you know, really, as I say, happy marriage, you know, she's happy, I'm married... Just kidding, you know, we are kind of together for a long time and erm, really gone through good times and er, very good times, as I like to say. And erm, you know, I have followed her twice, she followed me twice, so, we're kind of even now. Erm, sadly now, she has to wait for the immigration papers to come through so she can work again and er, it is very important for me that she is really erm, working, right. And she... It is very important for her, I try to help her as much as I can in her career as well, er, but she is very switched on. Er, you know, she really made sure that Moving Beans over the last three years grew year on year, really instrumental there.

I think she-she has seen so much and you know, and she has gone from very theoretical research on chemistry to a particle accelerator physicist, er, engineer, er, to very material science, to then going to smart cities, she worked for the Future Cities Catapult in London for many years, understanding start-ups, innovation, government. Then started er, our own company, Moving Beans and er, you know, she-she is brilliant, won-was shortlisted for a few awards, you know, won awards, so, yeah, so, that's-that's my wife. And erm, we spend a lot of time together and, er, I insist, er, you know, very few people know this and I'm just going to say it here, so, I insist on this once a week, we're going out, you know, no matter what, we're just going out and we're spending quality time, two or three hours in a restaurant and we always circle, my kids laugh... Indian. So, we often go to the Indian restaurant and now Mexican here. In London, we went to Peppe's which is an Italian restaurant, absolutely great. So, we haven't found a Peppe equivalent here, but er, we're going out every week, no matter what, Friday or Saturday for two or three hours, just chatting. No mobile phones, just really spending quality time together as a family. And I love it, I think the kids love it, and er, you know I think we are quite a close family, so, you know, touch wood, but it's-it's been good you know, and erm, yeah, that's about us.

[00:58:02]

Thank you. So, talking about, erm, food, erm, you appeared in the Macallan Distil your World London, to film with a Michelin star chef, one Josef, and Jordi Roca, and

in the film, one of the Roca brothers defines you as almost a renaissance man. Do you think it is a fitting definition and can you also give us a bit more context about this film?

[00:58:33]

Hmm, you know, er, actually they're not the first ones to tell me, so, Ali Hosseini, who I mentioned before, he is er, quite a well-known artist himself and er, probably I- I would argue what-what qualifies a renaissance man as well. He always said, "Mischa, you are like the epiphany of this" right, so, and erm, it's because I am trying to really breach the-the sciences with technology, with art, right. And I'm really bringing this together, in a way, which isn't just, let's use one for the other or, I'm really pushing the boundary of both. And if you think about it, specifically in the music stuff, we have actually, you know, done so much more than just my pioneering 5G concept with my daughter. We really worked with the National Theatre or the Young Vic, er, with the Royal Academy of Dramatic Arts, and the question, I post there is, how can we use, you know, this technology called 5G, to actually revolutionise the medium, where art is being created?

Right, so, if you think about it, you know Shakespeare, erm, you know Shakespeare created er, his-his plays assuming a certain stage, the round stage, it was really creative, the medium was a round stage and erm, that medium has stayed with us for, you know, centuries. And I always argue that the arts industry, erm, is very, very creative but not very innovative. And the tech industry is very innovative but not very creative. And erm, the renaissance movement I started, is to bring them together, to challenge them, right. And, er, specifically, the Royal Academy of Dramatic Arts and the Young Vic, er, with the National Theatre, the challenge I gave them; can we find a new medium, can we innovate on the medium which currently is your stage, can we do something new, can we do two or three stages connected in low latency? And we did it, we did a trial actually, in the Young Vic and we used Shakespeare's, erm, Midsomer Night Dream, and it was horrible, it was horrible; the best actors, best directors in the world couldn't make it work, why? Because Shakespeare wrote it for a single stage.

So, we then hired a very talented writer and she wrote us a piece which would really be adapted to this new stage, right, this new environment, which technology has facilitated. And er, it was essentially about the adoption of a child, the mother was giving away her child for adoption and er, the different stages. Before... So, on one stage we had before, er, during, and after. And it was a thought-thought process in her mind and the-the connection between the stages was the pen which she used to write and to sign the contract that she is giving her child away, right. And it-it was handed over from stage to stage and we really capitalised on the space/time relationship which this new medium offered and therefore, we started to create new art, right and it will happen with augmented reality, with virtual reality. So, therefore, I was really pushing the envelope, both from the artistic side as well as on the technology side. So, I think this is where it came from and that is what I explained to the Roca brothers, and the Roca brothers were on a quest around the world, to really find out, you know, talk to people, and really push the envelope in different domains.

And of course, they're Michelin Star, er, chefs, and everybody is specialised in different things, one is really on the food, the other on wine, the other in the-in the desserts. And erm, they have been always inspired by nature, by different cultures, by er, different thinking, and different industries, and er, they were just trying to get essentially, that essence of London, what is London really like? And London is that cross-disciplinary er, melting pot where you have everything you need in walking distance, right. And they came to speak, er, to speak to me and I showed them, er, the King's College Chapel, which in itself is a renaissance place because it wasn't just a religious place, it was a place where people could discuss different aspects of science, religion, and philosophy. So, you know, I have in this sense, carried that spirit of King's College into my research and innovation when I was in London.

But, yeah, it was fascinating to meet them, you know, we became good friends, of course. I speak, what they didn't know, and it was a funny moment, I speak Catalan, I am very fluent Catalan actually because my wife is Catalan, we speak home... At home, we speak actually Catalan. And erm, during the interview, at some point, you know, during the recording, the film recording in the chapel, I suddenly switched to Catalan and they were just completely frozen, they just didn't know what was going on. And we became really, really good friends then, and they invited me over and we

had, er, wonderful, you know, a 3 Star Michelin er, lunch with them, er, it was just fascinating. You know, really good people, er, very open-minded, very approachable, and-and very humble.

[01:03:29]

Very nice. So, what is your relationship like with the UK and London in particular?

[01:03:35]

It's love, er, love, infinite love, and er, you know, I'm not sure who said it, er, you know, if you get tired of London, you get tired of life, right. So, I-I-I'm now in Silicon, er, Valley, not because I got tired of London, I just love it, you know the people, the spirit, the energy, um, you know, you've got everything in walking distance. You've got the best universities, in fact, the density of the world's top 100 universities, is highest in London, it isn't Boston, it isn't Silicon Valley, it is London, right. So, er, we've got really great universities, er, so, therefore, er, great spirit, er, you know in terms of innovation research, we have fantastic students, erm, in the city. We do have a lot of er, financial backing, right, so, everything what is like big investment money, goes through London.

We have all the regulatory and government, er, focus here, so, all the political, er, decisions and the capital is being essentially done right in London. Erm, you know, you've the arts scene here, you've got so many things which are happening in London, and it's... I always say it's all happening within Zone 1 and 2 of London, you can walk it, you can walk it right. So, in any other part of the world, you need to take a plane, right. In the US, er, the US, I have pockets of er, fantastic excellence here, er, but I need either to drive for a very long time or I need to fly, whereas, in London, you get it all together. So, London will always be unique, okay, very unique and er, no matter what happens, it has always gone through troublesome historic times, I think it will always come out on top. And erm, I love London and you know, I have loads of friends there. Er, and who knows, right, so, what will happen, how will we stay in Silicon Valley? Er, my aim is always to stay forever, but er, it turns out every 10 years, I'm changing. But yeah, London is very, very, very deep in my heart.

[01:05:25]

So, let's move a little bit to Bristol, and you also met not only the Roca brothers, but also Robert Del Naja of Massive Attack, and can you tell us more about this encounter, how did you meet him?

[01:05:39]

Yeah, this-this came out when we started to advertise about our 5G capabilities, the low latency, the immediacy, you know, that capability and, erm, Andrew Melcher, who is the CTO of er, Massive Attack, he is a very switched-on guy. He got-he really does a scanning, what is going on in the technology of the world and er, you know, over the years we almost became like brothers, I would say, with Andrew. And he introduced us to Rob, and then we, you know, I-I immediately clicked with Rob and we are very close as well, er, I would argue; and er, maybe he sees it differently. But I, you know, we-we are definitely, er, chatting quite frequently, and erm, Rob is just, er, you know, he's just a phenomenal person really. I mean, he is such a lateral thinker and artist, in his own league and [unclear 01:06:28] there. You know, he is-he is, er, he is really a showman, right, so, like the Michael Jackson of his music kind of industry; I'm not sure he will like me saying this. But he is really comfortable of how he orchestrates different instruments, er, he plays a lot with the visuals, with the messaging.

So, this is not a traditional concept, this is a-a message, you know, it's a piece of art, every concept is crafted and er, since, I-I-I've got to know Rob really well, you know, he invited me also to [unclear 01:07:04]. And then you know, you sort of understand really the complexity of what is going on, and of course, in the Bristol studios, we talked a lot about how can you-how you can advance art in general? He loves to paint, right, so, he's, er, he's known to be a painter, or spray painter actually. And er, specifically, we looked at the notion of using robots to, er, to help him paint, co-paint, have machines, [unclear 01:07:25] by er, artificial intelligence. He has a lot of AI in his concerts actually, guns and all that, so, generative adversarial networks.

But-but specifically the project we looked at; can we use robotic arms to replicant his painting, co-paint, have machines co-create with them? And that was actually covered nicely in a recent Wired article, er, where exactly, he talks about these robotic projects. So, this was done with me and the effective robots were provided by-by us.

[01:07:55]

So, that is very interesting. Erm, what other encounters were important to you in terms of inspiration or in terms of what happened after?

[01:08:09]

Well, er, so, er, I've met so many inspirational people in-in, whilst I was in London, you know. Er, let me start at the beginning, er, Richard, Branson, er, Sir Richard Branson is, erm, is quite introvert actually, interestingly, right. So, I don't think he is very comfortable in speaking in large crowds and even engaging massively with people. But he is laser-focused and er, he is excellent in what he does. And er, you know, in 2013, I met Richard Branson and then later participated in his Carbon War Room Initiative where he tried to look at very big tickets on how to deal with the er, er, carbon crisis, the pollution crisis, er, happening around the world. A fascinating person really, and er, he inspired me a lot and er, we talked a little bit about scale, and erm, back then, Worldsensing. And I just got very, very much inspired by-by-by Richard Branson. So, that was one of the people.

The other one was, er, Angela Merkel. So, I was invited actually to one of the er, innovation events in Germany and er, you know what fascinated me about Angela, is that-that, erm, she actually knew what she was talking about. So, she was giving this... Because I was in the room with her, she was given a script to read from, but she didn't use it. So, she talked about spectrum, the importance of wireless, you know, even mentioning [unclear 01:09:30] out of her head, which means she actually understood what she was talking about. I was really amazed, I mean, you know, which other politician can really do this? And erm, you know, I think she has made a, you know, a phenomenal contribution to-to Germany, you know, to Europe and to peace in Europe. So, I-I'm-I just find, er, Angela Merkel hugely inspire-inspirational also, so, yeah, she was a big-big, er, big influence.

Er, who else did I meet? You know, I have met, erm, the co-founder of er, Café Nero, I'm not sure if you know Café Nero, so, I'm mentioning, Café Nero is quite a big brand-branch, in, erm, a coffee chain in London, in the UK, and er, Pablo, okay, he is actually, Ettinger, he is, er, he is German, he is actually a pianist, and why I find it so

inspirational is because er, Pablo, now, is doing a lot-a lot of stuff in music, you know. And in fact, the reason... I understood this later, why you always get classical music in-in Café Nero, is-is because Pablo is actually a classical pianist, and er, you know, so, we have a lot of stuff, er, to really discuss in terms of, you know, what-what could really, er, could really be-be erm, be the future of music and technology.

So, who else? I met a few other politicians, you know, er, Kevin Rudd, the former prime minister of Australia, er, very inspirational how he talked about the transformation he's been leading in Australia, some more from a governance point of view. And erm, er, loads of chief executives I met from Gucci, Yves St Laurent, inspirational people. Really people who are switched on, very keen to see how the industry is er, changing, and er, it was, it's great. Maybe in my TELCO world, I met erm, Hans Vesberg, the former Chief Executive of Ericsson, personally, we did a long video recording and spent a lot of quality time together. Erm, and now, when I landed here in the US, he actually also dropped me an email, he's now currently the Chief Executive of Verizon, you know, he-he also fascinated me because he was not only into technology, and not only did he lead one of the very difficult business transformations; you know, Ericsson being a very hardware-driven company, to something which is hardware and software-driven now. I think that was really started with, er, with Hans back then, you know. Erm, but you know, he is also into sports, helping sports teams, you know, really supporting his local-local e-ecosystem.

So, I have met a lot of people who I have taken different things from and er, really trying also to-to inspire myself and-and work, er, truly-truly with the best, you know, in-in-in the ecosystem, if that makes sense, you know.

[01:12:02]

So, you are now Chief Architect at Ericsson in Silicon Valley, would you like to share with us what is going to be your roles and your future plans?

[01:12:13]

So, the-the role is really, I mean, as-as architect what we do is we're trying to put things together and erm, you know, I am, I am not the person in Ericsson who is very specialised in a very specific segment. For instance, we have, er, you know, some of

the world's best people, in... Specifically in radio, of this very-very much, er, specialised in core network, transport network. You know, I'm trying really to contribute to Ericsson by helping on the internet architecture; how do you put things together so, the different constituents which we are world-class all together, so, we can really er, er, maintain our market leadership position and grow even further.

And, er, another aspect I think I can bring in this is to-to tell Ericsson really on how to-how to really con-convey the tech products we have better to society and to industry. Because as engineers, we are very good at talking about features, you know, megabytes per second, 10 milliseconds latency, edge cloud, slicing, and all that. Now, you go to an agriculture business or you go to a filming studio, in-in Hollywood, they don't know what to do with these numbers, right. So, they don't know what it means to them. So, therefore, you know, for us to learn, to go into the shoes of the customer and start to speak their language, erm, and really convey our world-class portfolio and leadership, er, through a different messaging; that is what I'm hoping to-to really help to contribute here in Silicon Valley. But I just thought it, right, so, I've literally just landed and it's all very new to me and I'm really looking forward to this new adventure.

[01:13:50]

So, maybe we should talk again in the future and see what happened.

[01:13:55]

Let's do this, exactly, let's do this in five years' time and you know, I hope I'll have made a huge dent here.

[01:14:01]

Yes. So, if you think about your career, what are the key lessons you learned until now?

[01:14:14]

Yeah, so, the key lessons I have learned is a good question you're asking me. So, on reflection, what I've tried to do is really every year, I look back, you know, I look back, I am literally doing this. You know, at the end of the year, I'm looking back

and saying, have I grown, have I really grown, you know, as a person; have I-have I become better, or have I made a, and or have I made a-a substantial contribution? Right, so, and if I haven't, I try really to change things, right, I really try to make sure that, erm, you know, I-I go in this direction of big change. I really would like to be a positive impact on our community globally, so, and that is something I really learned to do now, over these years.

The-the other thing I kind of learned or picked up on the way is that you know, er, to be kind, right so, it's a... Because I just realised that everybody is really fighting their own interview of the day; okay, that's at the end of the day. Everybody is busy, everybody has an endless amount of problems, whether this is somebody cleaning you know, the premises, or [unclear 01:15:24], or somebody doing research, you know, somebody being the chief executive. You know, they have 24 hours, it's full of troubleshooting, firefighting, and problems, so. Therefore, you know, to be kind to each other, I think is very important and I've tried really to stick to this, er, for-for-for all these years, you know, no matter what. A lot of people have told me that, you know, "Mischa, one-one thing we really learned from you is that kindness you have always shown, non-stop, no matter which position you were, no matter what leverage or power you had, you know, you wouldn't... You-you would always be kind" and I-I really would like to be that person, right. So, that-that kindness is something I think we need to see more, er, in this er, fairly difficult world as we are in at the moment. So, maybe these-these are two things, you know, which kind of shape me and shape me most, er, if that makes sense, yeah?

[01:16:15]

Yes, it makes a lot of sense. Erm, what are the proudest achievements of your career?

[01:16:24]

[Laughs] erm, proudest achievements, probably my daughters I have to say, but er, also, of being so happily married to my wife for so many years. But from a tech point of view, it was a moment in Los Angeles, okay. So, I had just, er, I was about to release my fifth album, er, "Stories From Another World", and we decided with the record label to launch it actually in, erm, in Los Angeles and, er, I had an opportunity there where I gave a plenary keynote in front of, er, 4,000 people, so, it was a really

big crowd. And, er, we ordered the grand piano on stage and er, I was, erm, I was supposed to launch my album there and show off some new tech capabilities like a haptic glove and all that.

And you know, I had, I've had stage fright for many years, so, I really struggle to go onto the stage and play in front of people. The reason being is because I had a very terrifying experience when I was a-a child at school, where I had to perform in front of the whole school, and it went wrong, and ever since I... Actually, that very same day, I decided I don't want to be on stage anymore and that very same day I decided, I will not play any piece of any other composer any more, because if I make a mistake, everybody will know, because they've heard it a million times. And that is the day I started to-to compose because I thought if I do my own composition and I play it, nobody knows, I can make as mistakes as you want, and er, it will always pass. And er, literally, that day, er, you know, I'm not making this up, that day I started to compose. I just sat on the piano, and I still have these very early drawings of my earlier compositions er, from that day. So, but the stage fright stayed, my composition skills increased, I composed these five albums over the, er, the next two decades. And erm, you know, 4,000 people on stage, I thought, you know, if I do it, I do it big. But I was so nervous, my wife was... You know, when I'm nervous, really nervous, I-I'm unbearable. So, my wife just said, "Mischa, er, just leave for Los Angeles, you know, I-I-I don't want to see you until you've done this concert." And er, and because I also did part of the concert with a haptic glove, I realised that actually, the haptic glove was only delivered to me the last day before I took off to Los Angeles, and it was quite thick, and it wouldn't fit between the black keys, and so, I had to recompose the piece on the plane to Los Angeles. So, I was literally sitting on the plane, not having any piano, blankly recomposing the piece. And landing in Los Angeles, and you know, I performed that and it worked really well and er, the rest is kind of history. But it was kind of a really pivotal moment in my life and I am very proud of this moment because I did this, er, not only I think a really brilliant tech keynote, but it showed the world what the Internet of Skills can do. But I jumped out of my own comfort zone and-and performed in front of 4,000 people. So, that is my proudest moment by far.

[01:19:15]

What would you do differently if you had your time again and why?

[01:19:20]

I probably, I would probably redo everything I've done, to be honest, you know. I, erm, I can't think of anything, you know, anything specifically. You know, if I-if I was to think, okay, if I wanted to have more money; I'm just, you know, philosophising here, probably, I shouldn't have done an academic career, I should have just-just gone straight into industry and become CTO, or CEO of, er, one of the biggest companies, you know. But then I wouldn't have had what I had, right, [cough] really, this cross-disciplinary kind of engagement, erm, very deep, er, engagement with technology and, er, with arts, I don't think I would have had it, right.

So, I think it all happened at the same time and you know, I had some downs as well, you know, where I co-founded a company, erm, in London, where, you know things haven't worked out with the co-founders. And erm, you know, I have to tell you, I-I have acted always in good faith and, er, always with my kindness, you know and I would, I would really get... And I would probably do exactly the same thing again, and so, you know, I have literally no regrets, I'm actually a person that really always looks forward, and erm. I-I-I literally, I think I am quite, quite happy with how we are and I'm very happy and proud that we managed to make it into Silicon Valley and be now in an environment where things really scale.

[01:20:37]

What advice would you give to someone willing to pursue your career today?

[01:20:42]

[Laughs] er, the career advice, in fact, it's very easy, it's very easy, you know. So, I-I don't like to give advice on a specific subject area. I really think people... What we need to learn more is the ability to adapt, right, because we are really getting into an era, where we are changing jobs and identity very quickly. So, if you think about our parents, they had their education for 10 years, and then they had their jobs for 40 years, right. And we are now in an era where we have jobs for 5 to 10 years, okay and we are currently changing jobs, it's kind of-it's kind of-kind of normal now, right, that one day, I'm doing, er, a company and the next day, I am a professor, and the next

day, I am chief Architect, right, so, it is quite accepted. Er, you know, I am not the only one with this profile, there are a lot of people with that profile, and a lot of people change even in shorter timeframes.

And, er, you know, when I told... Every time I told my mother that I am changing jobs, you know, she would literally freak out, because it doesn't work with her 40 years cycle, er, as such. So, and we, as parents, will freak out when our kids will tell us maybe every month that they were changing jobs, right. So, therefore the ability to change and adapt is very important and we should teach more of that at school and university, so, that soft skill is so important. And erm, to accept it, that changes will always be there, to, er, be able to upskill yourself without having, you know, so much bad influence, er, impact on the previous job you had. So, that-that flexibility I think is very important.

The other thing I tell people is to really... Every time you know, you grow, er, or you change job, you get a promotion to really make sure that two things happen. The first thing is you get, of course, more financial, er, remuneration, or more salary, but you also work less, okay. It sounds very counterintuitive, but it is very important I find. Er, it doesn't mean that you have less responsibility, you may have more responsibility and more accountability, but you should work less. Because otherwise, the steady-state, if you look in the future where people will change jobs every few months, you know, you're going to end up in the grave at the age of 40 because you have just overworked yourself, right. So, therefore, I always tell people to pay attention to this. If you get a promotion, you know, more money, less work, right, you really want to humanise your work, er, um, and that's really... And I think I've executed this really well, you know.

In King's College, I think I've done a little bit less in terms of what... I had much more responsibilities at the Centre, of 200 people, so accountability was higher, but, er, I had more time for my family, right, compared to my start-up time in Barcelona. Now, in Silicon Valley, I am working a lot but er, you know, I... And I have a lot of responsibility and accountability, but again, I am planning to take a lot of time for my family, I think it is really important, right. You need to live it, you need to... You need to really make sure that you-that you have a human life. So, think of work as

something which you should really humanise, okay, not something which should be fully automated in a sense, yeah.

[01:23:54]

Thank you, Mischa, it's been a real pleasure talking to you, and er, thanks for your time, I really enjoyed it.

[01:24:02]

Oh, thanks, thanks so much for taking me on, and, er, it was a pleasure being with you. You enjoy, er, Italy, Milan, er, you know, one of my favourite cities and I'll be trying to enjoy the valley. We have snow now, so, we're going to go skiing soon hopefully. Er, we have also nice beaches, good weather, good food. Let's get on and interview maybe in five years' time and see how things go.

[01:24:24]

Yes, please, thank you very much.

[01:24:27]

Fantastic, thank you, goodbye.

[End of Interview]