WE ARE ETH – Episode 3

With Martin Bosshardt, ETH Alumni, electrical engineer and entrepreneur

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[00:00:00] **Martin Bosshardt:** **I wasn't particularly interested in all those formulas. I was more interested in the playground of ETH, you know, they've got all the machines and the computers. And it's a phenomenal playground.**

[00:00:15] **Susan Kish:** We're delighted today to have Martin Bosshardt as our guest. Martin Bosshardt is the CEO of Anapaya Systems based in Zurich, an ETH alumni and we're delighted to have him as our guest, as we go through the stories of ETH. And maybe Martin, just to start, I'd love to ask how did you ever come to attend the ETH? I'm sure there's a story there. So can you share it with us?

[00:00:40] **Martin Bosshardt:** Yeah. Thank you for the question. I mean, ETH for me was very much like a destiny, because I was very much into disassembling radios and all kinds of equipment, but usually I wasn't really capable then to put it together again. So I asked my parents what do I need to learn to build these kinds of machines to build a radio or telephone.

[00:01:07] And they said, well, we have this neighbor, you should talk to him. He is really doing exactly that. And that was Professor Dr. Epprecht and he happened to be a professor for electrical engineering at ETH. I got the meeting with Professor Epprecht. It felt very formal for me. You know, it was a meeting and I had to go to his home. I was really nervous and then he served some tea and then I asked him what do I need to do, to learn that? And then he said, well, that's a very simple question and a very simple answer, you have to study electrical engineering at ETH. And that really engraved in my brain.

[00:01:48] So then it was clear. I have to start electrical engineering at ETH.

[00:01:55] **Susan Kish:** Did that mean that you had to study harder did that mean you did different activities? Did that change your life somehow?

[00:02:01] **Martin Bosshardt:** Well, you know, I wasn't really a good student, so, I mean, for me, it was really hard to get to that goal.

[00:02:09] I mean, I was in a way talented in mathematics and everything in, in a way that this related to mathematics, but I was really, really not good in languages. So I had a hard time to really manage school to that level. And then when I joined ETH, it was really tough because everybody was, was then good in mathematics.

[00:02:30] And obviously you can learn this kind of stuff, but you have to put a lot of effort in. And, uh, I wasn't particularly interested in all those formulas. I was more interested in the playground of ETH, you know, they've got all the machines and the computers, and it's a phenomenal playground. It was a phenomenal playground for me. Uh, ETH was not easy, to stay in this school.

[00:02:52] **Susan Kish:** So when you say a playground, what exactly do you mean? Because I have like one clear definition of a playground, but I bet it's different than yours.

[00:03:03] **Martin Bosshardt:** Possibly. Yeah, you're right. The playgrounds are very different to different people. So, you know, for example, there was a workshop you could use when you are a student that, ETH, where you could do all kinds of things.

[00:03:17] So I was for example, very much into approach it, where I try to build a floating lamp, like a magnetic floating lamp. And then I spent like, days in this workshop to build this kind of a device. And obviously that's not exactly related to mathematics. So I really had to do several of the exams twice, but it was - everywhere at the ETH you could talk to people, uh, doing exciting stuff. I think this is really something that was helping me also to find my passion, you know, what, what do you really want to do in life? Because there are so many options presented to students, at ETH and then in a way you can go so many different routes, but, uh, it's all there you can pick from all that's exciting. Right?

[00:04:10] **Susan Kish:** And you chose to get a master's right at the end of the year. But you did that overseas.

[00:04:17] **Martin Bosshardt:** Yes. I was aiming for a master's and I was very much into control systems and then I had the opportunity to do the master thesis in Japan. So that was also another very exciting aspect of ETH. Suddenly you had access to international people, people coming from all over the world and you, you met these people really at the cafeteria to talk and suddenly you had access to people coming from the states or from Asia.

[00:04:45] And that was obviously for me, very, very exciting. Especially at that time, we didn't have internet, you know, I mean, you, you were born in Switzerland and then you were born in Switzerland. And at ETH suddenly, the whole world was accessible.

[00:04:58] **Susan Kish:** It was your playground!

[00:04:59] **Martin Bosshardt:** Right.

[00:05:00] **Susan Kish:** So if I understand correctly, I was reading that you built a scanning tunneling microscope that could look at atoms, but what does that actually mean?

[00:05:12] **Martin Bosshardt:** At that time in Rüschlikon, there was the Nobel prize for this. They were able to first time in the history of mankind to make atoms actually visible, which is in a way crazy, you know, how can you make a device that looks at the smallest parts. That's in a way, very fascinating. And has a lot to do with control systems, because you need to control a needle very closely to the surface of atoms.

[00:05:40] So then that allows you to really make atoms visible, and we built one of those devices in Japan. And then we used that device to control a needle on the tip of an atom to really stabilize a device on atom level, which is in a way…

[00:05:59] **Susan Kish:** That's crazy!

[00:06:00] **Martin Bosshardt:** It's crazy. And it was really cool for us because you know, it was hard to make those atoms visible.

[00:06:06] And then you work like two months or even more day and night. And the day, I remember the day, when we suddenly saw these atoms, this is like landing on the moon, then obviously.

[00:06:17] **Susan Kish:** That's a very cool image. And then after you finished your master's, and if I understand correctly, you went to ABB and they said, how quickly can you pack your suitcase?

[00:06:28] **Martin Bosshardt:** Yeah, that was the reason why I really liked to go to ABB because I knew they sent relatively young engineers already overseas and you know, engineering is like a profession that really works globally. The law of physics are our global laws, even bigger. That's why I really wanted to work with a company that sends people abroad and ABB did that.

[00:06:51] Then, I managed to get a position at ABB as a commissioning engineer for power plants. And I knew that they will going to send me at some point overseas and I was hoping fast, but I wasn't expecting that fast actually. So, so it was really like, can you go, and then I think I had one week time to pack.

[00:07:13] So it was really fast in a way that was a great experience to be then really onsite and built these huge machines. Yeah.

[00:07:22] **Susan Kish:** So tell me about what that project was. That first project.

[00:07:26] **Martin Bosshardt:** I was a commissioning engineer on combined cycle power plants. Combined cycle power plants are basically gas turbines. And then you use the exhaust of a gas turbine to heat up a boiler water, and then use the steam to turn the steam engine again.

[00:07:44] And that allows you to produce electricity of fossil energy with a very, very high efficiency level. These machines produced like one gigawatt of power. So it's a really, it is a really big machine. So at some point we were 3,500 people on site uh, at the same time, it's really like a small city building, uh, building a project like that.

[00:08:09] And for me, that was very fascinating that you can bring people together and basically nobody really is capable to understand all the details of the entire project in all levels. But you can slice such a

project in, in specific, uh, sub projects and sub challenges, and then at the end assembly again. And that's basically what the engineering is all about.

[00:08:34] You, you know, you slide complex projects into manageable smaller projects and the assembly later again, and that was in a way, the fascinating part for me. How is it possible that so many people can build together – or I think we have 16 months' time to bring it on grid and it really was on grid exactly on the day when it was planned.

[00:08:59] So that was very, very exciting, uh, for me to see what engineering can do.

[00:09:06] **Susan Kish:** Could you explain to me what is a commissioning engineer? Because I'm afraid I'm not in engineering. So I, I just don't know..

[00:09:13] **Martin Bosshardt:** Yeah, I think it's a very good question. I'm sorry I didn't explain. Basically you, uh, when you build a power plant, you bring all the subsystems onsite and then you install them, but then they need to work together and you need to start each system and then coordinate and make sure that all these systems then work together. So that's what a commissioning engineer is doing. You, you start up a power plant and to give you an idea of the size. I mean, we, we managed something like 10,000 sensor signals and about, uh, 200 subsystems and we have like I think five main streams to run the machine. So these automated streams, then they were coordinating those 200 subsystems and produce finally then the whole machine to work as a power plant.

[00:10:11] **Susan Kish:** So after your time at ABB, and this was in Malaysia? Is that right?

[00:10:15] **Martin Bosshardt:** Right. First one was in Malaysia and second one was then in Indonesia.

[00:10:20] I understood also that, you know, when we optimize those machines, basically we did recordings of the controllers and sent them back to Switzerland. And then the engineers in Switzerland, uh, analyzed those data and sent us over the internet, new controller data. And then we could optimize the machine sort of overnight.

[00:10:40] And that was I think a key experience for me to see: okay, I believe internet is going to be big. That you can optimize overnight in another country on the other side of the world, a power plant, and then just load data into a power plant controller and then you have like seven or 10 megawatts more power, just like that.

[00:11:02] That, that was in a way, an exciting demonstration of the power of internet.

[00:11:11] **Susan Kish:** So you decided to leave your wonderful job, which I'm sure paid you very well at ABB and join a web company / web agency?

[00:11:21] **Martin Bosshardt:** Yeah, it was a friend, actually. He was building an internet company for Young and Rubicam and then he asked me whether I would like to join sort of as a project manager, because yeah, the first internet agencies were very much driven out of the advertising industry and the advertising at that time was not very complex from a technical project management perspective.

[00:11:45] And then with the internet communication, the technical project management capability became more important. So he thought, well, if you can, uh, help running a power plant that's probably also great for websites. And for me it…

[00:12:03] **Susan Kish:** Not sure if I see the connection between the two of those.

[00:12:08] **Martin Bosshardt:** Yeah. I mean, it was definitely – these were much smaller projects, but the concepts were the same. Right. So you had to bring together like knowledge of communication, designers, programmers, and database guys. And so it was already much more complex than let's say a TV spot or something.

[00:12:29] **Susan Kish:** Did you know your friends from the ETH?

[00:12:31] **Martin Bosshardt:** No, actually before that, and then during the time when I was, uh, with Future Com, that's was to company, we built websites I had a contract on the desk for a company called Open Systems and the name of the guy sounded familiar. And then I realized, Hey, this is, this is Florian at ETH, he was one of the guys giving me access to one of those wonderful machines, communication machines.

[00:13:02] **Susan Kish:** So he was on the playground.

[00:13:04] **Martin Bosshardt:** That's it, I knew him from the playground and then we built websites for him. It was then also later that he asked me whether I would join Open Systems as a CEO, uh, right after the Dot Com collapse.

[00:13:20] **Susan Kish:** Ah, so this is like 2001, 2002. That was, I remember that nuclear freeze time.

[00:13:27] **Martin Bosshardt:** Yeah, that's a good term. Nuclear freeze.

[00:13:30] **Susan Kish:** It wasn't the best of time. So talk about your experience at Open Systems. And it also seemed like at Open Systems, you kept a pretty tight relationship with the ETH.

[00:13:42] **Martin Bosshardt:** That's right. I think ETH was always an inspiration and it was always very important. Also in terms of talents, we had a lot of close projects together with ETH, uh, in terms of, uh, innovation projects for networking, for network security, and that also then allowed us to be in close contact with great talents, uh, at ETH.

[00:14:08] And some of them also then decide, okay, I want to take this further and then joined the company. And I think ETH is just a magnet for talents on a global scale. I think this became even more the case now in the last couple of years, it's really is a global magnet.

[00:14:28] **Susan Kish:** You connected with the CEO, the founder, through the ETH, you hired people from the ETH. Sounds like you also did some research or at least supported research to try and get a step ahead where the sector was going. Um, it sounds like ETH was a really important partner across that time at Open Systems.

[00:14:49] **Martin Bosshardt:** I think ETH for me is very, very important. And I think it is for many people, it's a magnet for a lot of things, for innovation, for people, for new ideas. Also for startup companies also for research for large companies, uh, I think we cannot overestimate the power of this ecosystem uh, ETH is building here in Switzerland. Yeah.

[00:15:14] **Susan Kish:** So can you talk about the current company where you at and how did you, what was your story in terms of connecting with them?

[00:15:21] **Martin Bosshardt:** You know, all the dots, they always connect, right? So during the time at Open Systems we did research projects with ETH and also some projects with Professor Perrig and Professor Perrig, he was, uh, doing research on, on how to improve internet. And in 2012, he started to develop the new SCION protocol. SCION is a protocol that really helps to improve, or basically secure today's internet. Today's internet has its roots in the eighties, and it's definitely not designed to what it is doing today. So that's also why we have these kinds of quite severe outages. Like we just experienced with Facebook or, or others. I mean also all the denial of service attacks. So that was a big field also very interesting for open systems.

[00:16:15] And then when I left open systems and just joined the board, I handed over all my operational duty. So I had some time and then he approached me whether I would like to join Anapaya. Anapaya is a startup spinoff company of ETH bringing the SCION protocol into the market.

[00:16:34] **Susan Kish:** Right now, I think of protocols and I think of IP protocol. Does it replace it, whereas it's sort of the next generation, or how does this interact?

[00:16:42] **Martin Bosshardt:** In the eighties there were many IP networks, and then there was really the question how can you connect those IP networks to one over network, the inter network. The magic is the border gateway protocol. So that's the protocol that stitches all those networks together. The BGP protocol.

[00:17:06] That's developed in the eighties. And it's, it's quite fascinating how scalable this was designed. And it still is. It's working amazingly. Uh, it was never designed for that.

[00:17:18] **Susan Kish:** Right.

[00:17:19] **Martin Bosshardt:** And that's also why it's a little scary and a little dangerous in a way you put a lot of very critical infrastructure on internet.

[00:17:27] The fundamental protocol is this BGP protocol, which is very easy to attack and very easy to missmanipulate. So SCION is basically replacing BGP. And so it's not like replacing the internet, it's just upgrading the internet infrastructure as we know it. So that's also why

I'm very sure this is going to be a success because it's not like 5G, where you have to build new antennas and stuff.

[00:17:55] So it's just really like a small upgrade.

[00:17:57] **Susan Kish:** So it's like when Apple upgrades my phone operating system overnight, and I don't even know that. That kind of upgrade?

[00:18:04] **Martin Bosshardt:** Basically, yes. Because also if Apple upgrades your iPhone, it's quite, it's quite something in the back that's happening and it's, yeah, it's very comparable. You have to upgrade a couple of routers, but there are actually many.

[00:18:20] **Susan Kish:** Martin, when you talk about engineers, I have the feeling that, uh, engineers are the, the secret to the future. And that instead of studying the history of science, I should have really tried to study to be an engineer back when I was in college.

[00:18:34] Why do you think being an engineer is so critical and if you had the choice, it sounds like you would be an engineer again, but is that right?

[00:18:43] **Martin Bosshardt:** I just think that many people probably, if they would know a bit more about what engineering is about, they would find their passion in engineering because you can really do a lot.

[00:18:56] First engineering is, is using the law of physics and these laws are just globally. And I mean, you can change the world. I mean, if, if you think how the, the world changed over the last 10, 20 years. It's mainly based on engineering concepts.

[00:19:17] **Susan Kish:** So if you were to give advice to someone who's just starting off to either in their career or picking their major in college, what would you advise? Computer science, engineering?

[00:19:32] **Martin Bosshardt:** The very first title, I would say, is follow your passion.

[00:19:38] **Susan Kish:** Okay, good.

[00:19:39] **Martin Bosshardt:** This is really, I think the most important thing.

[00:19:42] **Susan Kish:** Martin, leadership today is a challenging thing, right? The world changes really fast. Technology changes really fast. Geopolitics are nothing if not complicated.

[00:19:54] So as the CEO of Open Systems and now the CEO of Anapaya, what, what are the key qualities that a leader needs today or key areas that they need to really understand at a deep level?

[00:20:10] **Martin Bosshardt:** Yeah, that's a very good question. I think that, you know, there's a lot, a lot about leadership written and you can learn a lot about leadership.

[00:20:18] And I think what probably fundamentally changed in the, in the last couple of years is, that you really need to understand at some point, especially if you are in a, in the tech industry, that you need to understand in a way, the fundamentals of your product and the fundamentals of what the company is doing. And I think that's also a reason why we see a lot of engineers leading companies, I believe maybe 10 or 20 years ago, if you understood the business fundamentals very well, it probably was in many cases sufficient.

[00:20:55] And I would say, especially if it's changing so fast, as we see today right now, where technology mostly are, the changing factors uh, of innovation and new business models, I believe this has really became very, very important. And let's say a couple of years ago, I hear it a lot like, yeah, this is, this is very technical uh, maybe you should talk to the IT department somewhere, you know? And I think that changed.

[00:21:24] **Susan Kish:** You mentioned your time at ETH when you were an undergrad. Is there any particular place that you'd like to tell about?

[00:21:33] **Martin Bosshardt:** Yeah the most important place for me was the cafeteria. I think it's one of the most inspiring places, at ETH.

[00:21:41] And also I met my wife there, so...

[00:21:44] **Susan Kish:** Oh, in the cafeteria?

[00:21:45] **Martin Bosshardt:** In the cafeteria. So, so in a way it's, it's, it's definitely, I think the most important place at ETH for me.

[00:21:53] **Susan Kish:** So Martin, thank you so much. Thank you for your time. And, uh, thank you for joining us today and our ETH conversation.

[00:22:02] I'm Susan Kish, host of the We Are ETH series. Please join us and subscribe wherever you listen to podcasts.

[00:22:09] I'd like to thank and to credit our producers at the ETH Circle and Ellie Media. Take care and stay safe!