WE ARE ETH – Episode 32

With Georg Polzer, Computer Scientist and Co-Founder of the ETH spinoff company Terralytics.

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Chapters

[00:00:00] **Georg Polzer:** **If you design it around the travel needs of everyone, right? So not just the 2 percent of people you catch when you run a survey, right? Or not just the cars you count on the road you've installed your sensors. But we think you should really incorporate the needs of all citizens and also not the needs five years ago or 10 years ago, as some of these surveys are. Right? You want to base your design of transportation systems on very recent data and all-encompassing data about how all your citizens move around the city.**

[00:00:40] **Susan Kish:** In this episode, I'm talking with Georg Polzer, computer scientist and co-founder of the ETH spinoff company, Terralytics. This is the We Are ETH podcast, and I'm Susan Kish. Your host.

Georg, when did you start being interested in computer science?

[00:01:03] **Georg Polzer:** That was

[00:01:04] **Susan Kish:** And how? What was the catalyst?

[00:01:06] **Georg Polzer:** I guess that that started, I think, during school there was a LEGO Robotics League that was taking place and I was, I happened to be part of that group of people and kids basically competing in that LEGO Robotics competition

and we ended up actually qualifying for the German final round here in Berlin way back and I think it was one of the early touch points with computer science kind of topics.

And then also, of course, at home, I started putting together my own computers. And yeah, I think in that kind of middle high school age, I started to get exposed to that.

[00:01:47] **Susan Kish:** How did you come to attend the ETH because you grew up in Germany, right? I realize they're next door to each other, but they're wonderful technical institutes in Germany as well.

[00:01:57] **Georg Polzer:** That's true, yes. I mean, I think the ETH is special, right? I mean, there are other German universities that are playing in a similar range in terms of research and education excellence, but the ETH is is one of the very few ones I think in Europe that really play on the kind of the global league.

And yeah, I think that to me was it was interesting, right, and appealing as a first reason to go there, combined with also the fact that Zurich is a beautiful place to be in Switzerland, which is a beautiful country. That was probably more of a coincidence, but also some of my friends from my high school actually also happened to attend ETH.

So a little group of people actually went there, of Germans. I think it was a great decision and I had a fantastic time there.

[00:02:45] **Susan Kish:** And you mentioned Berlin. You recently moved back. You had been living in New York. Is that right? And now you moved back to Berlin?

[00:02:51] **Georg Polzer:** Yeah, I moved quite a bit actually in my life since I'm a little kid.

My parents, due to their jobs, moved around quite a bit, um, within Germany. And then of course I went to a boarding school for the past, uh, for the last four high school years. That was in, uh, Naumburg in Sachsen Anhalt, that's a really, in the middle of nowhere, it's a little, like, boring school and, and you just have vineyards and forest around it, but it's a beautiful place.

[00:03:18] **Susan Kish:** Sounds pretty idyllic.

[00:03:19] **Georg Polzer:** Exactly. And then I moved from there to Zurich and start… yeah, started the company and then moved to New York for a while for the company and then went back, um, to Berlin.

[00:03:28] **Susan Kish:** What caused you to leave New York? New York's a pretty fun place to live.

[00:03:32] **Georg Polzer:** It's great. Yeah, we had a great time there.

My older daughter was born in New York and we just realized that living so far away from your family and your, and having, yeah, little support besides professional staff, so to say, right? And maybe some friends. I think it's just really tough when both wife and husband are working, right? So we want to be closer to the family.

And also raising a kid in New York is, it's a tough environment, right? I think if you've grown up, it's, it's great, but I think for, it's not necessarily a place um, for kids, I would say.

[00:04:08] **Susan Kish:** You lived in Manhattan? Or Brooklyn?

[00:04:09] **Georg Polzer:** Yeah, we did. Yeah. In the West Village. Yeah, exactly.

[00:04:12] **Susan Kish:** Oh, the west. I lived in the West Village for many years.

[00:04:15] **Georg Polzer:** Oh, great.

[00:04:15] **Susan Kish:** And now you're back in Berlin. How is Berlin? Berlin is not an idyllic little village. Berlin's a global Intense city.

[00:04:24] **Georg Polzer:** It is, but it has those, this very interesting characteristic of something they called Kieze. So Kiez is like, um, kind of Berlin slang to say for, for like sub areas of the city that, that kind of feel like little sub village even within the city.

You'll be surprised how many kind of quiet streets and little parks and squares you find there. These are not necessarily the places where where tourists go like actually there's some very livable areas within Berlin that aren't as big and touristy as others.

[00:05:01] **Susan Kish:** Very, very cool.

[00:05:01] **Georg Polzer:** So yeah, we have a great place here and it's definitely more quiet and livable and walkable for sure than New York is.

[00:05:09] **Susan Kish:** So while you were at the ETH, you were a founding president of something called the Entrepreneur Club. Did I read that right? Did you start that from scratch? There hadn't been an Entrepreneur Club?

[00:05:21] **Georg Polzer:** Yeah, that was surprising actually.

[00:05:22] **Susan Kish:** Yeah, it is surprising. Exactly right.

[00:05:24] **Georg Polzer:** I mean, back then, way back was, was 2010 or something.

Yeah, but back then there wasn't a student association. Uh, focused around entrepreneurship, there was something similar, which I'm very grateful for, which is called ETH juniors. So ETH juniors is another student association that's operating some kind of student run consultancy. And I was part of that group of students and which gave me a lot of yeah and just personal growth and also lifelong friends that, that developed during that time. But you usually do this for one year and then afterwards you're back to normal student life. And I was already thinking, ETH Juniors already teaches you some of those entrepreneurial skills and interests. And yeah, I just noticed there wasn't any association around the topic and there were some other people who said we need to change that.

And so together we, we started the club and I'm really happy that this club, the Entrepreneur club still exists and is thriving. I think it's a, it's a quite an active group of people.

[00:06:27] **Susan Kish:** So you did the entrepreneurial thing. You saw a problem, you saw a market gap and you said, I can do this.

[00:06:32] **Georg Polzer:** Yeah, exactly.

[00:06:34] **Susan Kish:** Fantastic.

So what was the catalyst for you to start Terralytics? How did you go from studying your Masters in your Bachelor in computer science to saying, I know enough to take that and turn it into a entity that's going to make a difference. And by the way, Terralytics looks very cool in terms of the data that you look at.

[00:06:55] **Georg Polzer:** Thank you. Yeah, it was probably less planned as you would maybe expect. I was doing a masters. I was a research assistant on one of the computer science um, research groups led by Professor Donald Kosman, who in the meantime actually is in a quite senior position at Microsoft in Seattle, but he used to be a professor back then at ETH.

And we were doing research during that time in an area that was just emerging back then. And today we just take that for granted, right? But back then this term big data was new up until that point, like the mid 2000s data used to be just very clean kind of Excel sheet records, right? Or database records, right? Like you have a name and the address and the, and the

[00:07:42] **Susan Kish:** all these different columns.

[00:07:43] **Georg Polzer:** Yeah, like

[00:07:44] **Susan Kish:** pivot tables bit

[00:07:45] **Georg Polzer:** nicely organized, right?

[00:07:47] **Susan Kish:** Right.

[00:07:47] **Georg Polzer:** And what changed was that the concept of big data was that you would start to tackle unstructured data sets, like image and like just free texts on the internet, so it's, it's both unstructured, but also very large, like the size of the data sets really became big and that was also enabled by the fact that the storage costs went way down over time, but you just also could afford to store much more data.

And so the question then was, how do I deal? With these large amounts of unstructured data sets, how do I efficiently analyze the state, these data sets and do calculations on top of that. And we did research in that area and just felt there being marked opportunity that not just me at ETH, but also, and we were doing research together with some of the big companies that like the Zurich based banks, for example, who that we saw in the industry, these kind of data sets are starting to emerge and being collected and the need for analyzing those is starting to grow. And we said, let's start a company around that. And so this was, I think, in hindsight, one of the lessons I've definitely learned, this was very much a hammer looking for nail kind of, um, founding story, which is actually not a good one. Like it's a tough one. And it took us quite a while actually to find the right nail. And that was part of the journey we went through in during Terralytics.

[00:09:07] **Susan Kish:** And from what I can see on the site, the nail that you work with has to do with transportation data sets, working with urban centers or cross urban centers.

Can you talk about the problems that, now that your nail has been defined, what are the problems that your nail solves?

[00:09:27] **Georg Polzer:** Yes, what we see is that transportation is still very inefficient. It's still very polluting. It's still very noisy. It's still, it's not, it's not, it should be working much better.

[00:09:40] **Susan Kish:** I live in Boston right. We are not public transportation here.

[00:09:44] **Georg Polzer:** Yeah, exactly. And we have a big, big part of our business is in the U S actually. So I'm very familiar with these issues. I'm going to be a TRB in Washington on the beginning of January.

[00:09:54] **Susan Kish:** Transportation research board ?

[00:09:56] **Georg Polzer:** Yeah, great. Yeah. Yeah. I'm surprised you, you know, that I Do you have some interactions with the industry as well?

[00:10:01] **Susan Kish:** I work with the Department of Energy, which interacts a lot with the Department of Transportation on issues around, around EVs and transport

and design. Plus I have a daughter who works for a company called Mobicon, which does street design and transportation.

[00:10:17] **Georg Polzer:** Okay, great. Yeah. So, so I'm sure she will attend TRB as well then.

Yeah. But so back to the issue we are, we're tackling that we think transportation can work better if you design it around the travel needs of everyone, right? So not just the 2 percent of people you catch when you run a survey, right? Or not just the cars you count on these, on the roads you've installed your sensors, but we think you should really incorporate the needs of all citizens and also not the needs five years ago or 10 years ago as some of these surveys are right. You want to base your design of transportation systems on very recent data and all encompassing data about how all your citizens move around the city, and really also reflect the needs of more vulnerable parts of the population, like lower income parts of the population, and elderly people who have special needs in terms of getting from A to B, like those needs you want to incorporate in in the way you design transportation systems.

And so we do that by collecting large amounts of location, anonymous location data sourced from telecom network operators and from GPS data sets that come from smartphones. And we turn that into the information of not only how many people move from a to B, but also which road do they use? Which mode of transport do they use?

[00:11:45] **Susan Kish:** Oh, because you can track the speeds. You can figure out if they're walking or taking a bus.

[00:11:49] **Georg Polzer:** Absolutely. Yeah, exactly.

[00:11:49] **Susan Kish:** Or if they're on a train. Oh, that's really cool. There's an equity aspect to access and an equity aspect to that approach. That's really interesting.

[00:12:00] **Georg Polzer:** Yeah, absolutely. As I said, represent the needs of all the parts of the population.

And not just the people who can afford a car, right, um, or can afford the gas to, to drive to work every day. Also, the, the transit is very close to my heart.

[00:12:15] **Susan Kish:** So one of the questions that comes up around this is, presumably you use anonymized data, but how do you address, there must still be concerns about data privacy and using the data for not, I wouldn't say illicit, but Not always for the right reasons.

Can you talk about that? And how do you address these questions of data protection and data privacy?

[00:12:45] **Georg Polzer:** First of all, we started out in Germany, which is probably one of the hardest markets to pick in terms of data privacy laws. And I think that prepared us well for a global rollout. So in Germany, we are, yeah, basically compliant with all the, the privacy laws that, that exist in Germany, but also in Europe.

And we do that by restricting the types of questions we allow to be asked on the movement data we provide. So we, for example, limit the size of the groups of people that are part of a result of a query to, to include at least five people. So it's always at least five people. That means if you then say me as a transit operator, I want to understand how many people traveled on this route between this station, the station in this hour, you will see a not available value, so to say, if there are less than five people traveling in that hour on that line.

And then also some other approaches are, for example, that we limit the size of the, so what we allow our transport planning customers to do is we allow them to upload their own zoning system onto our platform because they want to, they have a specific, usually very specific way how to divide up the city and so called into so called transport analysis zones, TAZs.

And we make sure that those zones aren't too small, right? So you cannot hone in to a specific house, for example, right? So we have a number of

[00:14:13] **Susan Kish:** so you can't trace a person to their home?

[00:14:16] **Georg Polzer:** Correct yes, we make sure those zones are large enough that you cannot do that, for example, and then also again applying this limit of at least five people in the group.

These are approaches that we take to to really minimize that risk.

[00:14:29] **Susan Kish:** So, one of the interesting research I was reading about transportation is not just ensuring that you design for everyone, regardless, presumably, of economic situation, but also by gender. Women travel differently, children travel differently, older people travel differently. How would you, and theoretically, transportation should be designed differently for those different groups. Is there some way you can use the data that you see to help cities and transport authorities design for that?

[00:15:00] **Georg Polzer:** Yeah, definitely. And I think also us from a product perspective, we're still in the early innings of rebuilding out that vision.

So I think the first step that we take is that we ensure. Those people are represented in those data sets in the first place, right? Like when you, for example, look at who are the ones who take more transit versus cars, right? Like he says, specific groups of people. And we make sure that all those different groups of people are represented in our picture of human movement and mobility needs.

So that's the first step. And then the next step is sure that certain parts of the city are represented well, like maybe Lower income areas of, of the city, right? Thanks to the data sets we use, you, you don't have a lower, um, sample size in those areas versus higher income areas, right? So that's, that's very important.

[00:15:47] **Susan Kish:** You can balance out the waiting. Very cool.

A few years ago, you moved to more of a. Senior executive overseeing role at Terralytics is chairman of the board. Are there other projects you're working on now?

[00:15:59] **Georg Polzer:** I mean, of course I have two kids, which is a

[00:16:02] **Susan Kish:** two major projects, complete start ups,

[00:16:04] **Georg Polzer:** two major projects so that's for sure. And, um, but the answer is no. So I'm still very operationally involved for me that that was actually a, so that that changed to a chairman position was also coming together with a taking over the leadership of the software development division of the company. So it's actually more moving to a more technical role again. And we brought in an external professional CEO who had a few more years of experience than me just fresh out of university.

And yeah, that, that was, I think, an important decision for the company.

[00:16:37] **Susan Kish:** Very Bill Gates of you.

[00:16:40] **Georg Polzer:** Well, I think actually, so Bill Gates, didn't he stay on?

[00:16:44] **Susan Kish:** He did, but he also brought in professional managers.

[00:16:46] **Georg Polzer:** Yeah, that's for sure. That's a theme as a technical foundry that you bring in those external support for sure.

And I think it was a right decision. Michael, who's now the CEO of the company. I think he's fantastic. He's coming from the transportation domain and this probably is one of the key learnings that I have is that ETH doesn't, teaches you the technical skills, right? But not at all the domain skills, right?

And especially as we found this product market fit in the transportation sector, you really want to make sure that very quickly you augment the team of people who come from that space. So that there was it's for us as a company, a very positive development.

[00:17:23] **Susan Kish:** Very cool. And in that role, we talked about the contributing factors to the emergence of the concept of big data, this unstructured data and dramatic drop in the cost of storage.

But at that time there was also a surge in these tools that we used to call machine learning, right? And the ability to apply which I have to confess, I've never quite understood the difference where machine learning ends and AI begins.

[00:17:51] **Georg Polzer:** Thats a very blurry.

[00:17:55] **Susan Kish:** But with this explosion of interest in generative AI and large data models, LLMs or whatever they're called, how are you seeing that play out in the work that your leading in Terralytics?

[00:18:08] **Georg Polzer:** Yeah. So first of all, we are applying methods that used to be called machine learning that you would call AI now to, to do quite a few things in our computation pipeline. So for example, the detection of mode of transport and based on very fuzzy cell tower pings, right? They are just, if you look at them, they look, you as a person wouldn't necessarily be, you wouldn't be able to pinpoint this is now a train or a car.

[00:18:34] **Susan Kish:** Mm-Hmm.

[00:18:34] **Georg Polzer:** But as you train those models, they actually become very good at doing that and, and better than humans. So I think this is one area where we apply those methods to detect mode of transport out of these huge data sets. And I think in terms of generative AI and LLMs, we haven't build functionality into the product yet. I think one area that I think is interesting is in the interpretation of data and outputs. I think the LLMs are very powerful when you enable the user to ask simple questions like, what should I do based on those? Those results that Terralytics is telling me, like where should I build a bike lane, for example.

And I think that instead of me having to juggle the data, slice and dice the data to the answer, I'm really creating this more kind of conversational interaction with the product. And that's something for us that's very exciting and something we'll want to add as features.

[00:19:29] **Susan Kish:** How did your studies in computer science at ETH and your sort of broader experience prepare you for what you're doing now?

[00:19:38] **Georg Polzer:** So. Of course, first of all, there's the subject matter in terms of just building software, building algorithms, building scalable computation systems. That's something that you learn ETH and EH is very strong at. And I think it's not necessarily the specific programming languages or technologies. I think it's much more the thinking and the more fundamental abilities that you learn during ETH.

But I, when I was a student, what I've felt was very tough in the first few years where these basic math and physics classes. But I think in hindsight, I'm grateful for that time. Like it teaches you, um, yeah, way of thinking and just being rigorous and detailed in the way you work, which was, I think, very helpful.

So I think that's how ETH helped for sure. It helped a number of my, like. Co founder was a, was a student at ETH. So a number of really key employees who are still working in the team. They are alumni of, of ETH, right? Who graduated with me back then, right? Yeah. So I think the ecosystem played a role. So I think, and then of course, also without Donald Krossman, who's one of our co founders, I don't think we would have gotten where we are now.

So I think ETH has contributed in a number of meaningful ways to Terralytics.

[00:20:59] **Susan Kish:** Georg, thank you. That was a great conversation.

[00:21:04] **Georg Polzer:** And yeah, thank you for the time.

[00:21:06] **Susan Kish:** Thank you. I'm going to close with some questions that we always ask our guests to start when you were young. Maybe when you did that, like a competition or before, what did you want to be when you grew up?

[00:21:18] **Georg Polzer:** Oh, I think it changed multiple times and.

[00:21:23] **Susan Kish:** That's healthy.

[00:21:25] **Georg Polzer:** I don't think I ever thought I would want to become a entrepreneur or a computer scientist. I think doctor was I think I remember. Um, but yeah, of course that knows what your parents are doing is sometimes interesting. And they're not like the, you swing between those two extremes.

Yeah, I think it's, these were the, the kind of ideas I had and I'm glad I'm, I ended up where I'm now.

[00:21:45] **Susan Kish:** And what what sparks your curiosity today? What are you learning today?

[00:21:51] **Georg Polzer:** So I think the one area I'm definitely interested in is this whole acceleration around AI, LMS. That's definitely something I'm very interested about and, and also, yeah, just experimenting a little bit in my, my spare time with, so that's fun and interesting and of course the..

[00:22:12] **Susan Kish:** You downloaded the chat GPT function on your phone, the app?

[00:22:16] **Georg Polzer:** Well, I think a little bit beyond that.

[00:22:17] **Susan Kish:** Okay. All right.

[00:22:18] **Georg Polzer:** Among others, of course, yeah. But I think the other areas is also in terms of the, what we're doing at Terralytics is something that's really also

like a lifelong mission for me to make cities work better. And for example, I've started here a grassroot organization in my neighborhood here to, I'm not sure whether you came across the concept of super blocks in Barcelona, so where they just close streets and turn them into parks.

And I think that's just a fantastic way of thinking about cities. Reclaim it from the, from the, from the cars. I mean, it's still with two kids, it's still crazy to me that I need to watch out for them before they can step in front of my house. They can't do that alone. And like, that needs to change. Of course you will have places where cars can drive fast because you need to go to work or you need to deliver a package or something but I think there are parts of the city that just should be turned into something more human focused and my personal activities around that really fits with the company's goals as well.

[00:23:17] **Susan Kish:** Very cool And what are the books that are on your nightstand?

What what are the things you're reading or the podcast you listen to these days?

[00:23:27] **Georg Polzer:** Yeah. So, so right now I'm reading the biography of Elon Musk, which is great. Just very, very impressed by his story. And that also, besides that is a half read book about the philosophy of biking again, from a city design perspective.

That's something I'm interested in, but also I'm a I'm a big fan of gravel biking, not sure whether you're familiar with that, like off road (what is it called?) gravel biking. So it's like an off road, high speed racing, like bike racing, basically. So you go like off road through the forest and yeah, that's, uh..

[00:23:58] **Susan Kish:** When you say a big fan, does that mean you actually do it?

[00:24:01] **Georg Polzer:** I do it.

[00:24:02] **Susan Kish:** I'm pretty sure you got that right. No, no, I don't. Okay, well, that's it. That sounds both fun and a little bit scary, right? Because they're not, you know. You, you, you have branches and trees and bevels, rocks..

[00:24:14] **Georg Polzer:** Want to be prepared, but it's a, it's a great, great contrast to, to living in a city, you know, like, like it's, it's great if you just cycle half an hour outside of Berlin, you suddenly are in the midst of the, of nature and just so experiencing that is fantastic.

[00:24:28] **Susan Kish:** Very very cool. And when you go back to Zurich, as you are planning to coming up, what's your favorite place in Zurich writ large or at the ETH?

[00:24:38] **Georg Polzer:** So as a transport enthusiast, of course, the Polybahn...

[00:24:42] **Susan Kish:** Oh yeah, thats the coolest. It's true.

[00:24:43] **Georg Polzer:** That's the coolest. That is great. And then I think besides that, I think the lake is a big asset.

[00:24:50] **Susan Kish:** Fantastic. Thank you so much, Georg. Really appreciated your time and the conversation.

[00:24:56] **Georg Polzer:** Thank you, Susan. Talk soon.

[00:25:00] **Susan Kish:** I'm Susan Kish, host of the We Are ETH series, telling the story of the alumni and friends of the ETH Zurich, the Swiss Federal Institute of Technology. ETH regularly ranks amongst the top universities in the world with cutting edge research, science and people.

The people who were there, people who are there, and the people who will be there. Please subscribe to this podcast and join us wherever you listen and give us a good rating on Spotify or Apple or YouTube if you enjoyed today's conversation. I'd like to close by thanking our producers, ETH Circle and Ellie Media, and especially by thanking you, our listeners, for joining us.

Links of topics mentioned in the episode:

Association Changing Citys: Changing Cities e.V. – klare Stimme für die Zivilgesellschaft (changing-cities.org)

Bio Elon Musk: Elon Musk : Isaacson, Walter: Amazon.de: Books

Book: Die Philosophie des Radfahrens : Ilundáin-Agurruza, Jesús, Austin, Michael W., Reichenbach, Peter: Amazon.de: Bücher