

WE ARE ETH, Episode 50

David Dao, co-founder and chief scientist of GainForest

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- 00:00 Introduction to the Episode
- 00:43 David Dao's Recent Experience at COP
- 02:19 Climate Finance Negotiations
- 03:53 Role of Youth Activists at COP
- 04:36 GainForest and the XPRIZE Journey
- 07:08 AI and Indigenous Communities
- 18:39 David Dao's Personal Journey
- 23:35 Final Thoughts and Reflections
- 26:13 Closing Questions

[00:00:00] **David Dao:** And then there was this wonderful indigenous woman looking with very curious eyes at our workshop, but we're telling her about AI and like chatbots, Marina Mura from the Mura people. And she approached us afterwards and said. This is so fascinating, how can I get involved?

[00:00:23] **Susan Kish:** In this episode, I'm talking with David Dao, an ETH Zurich alumni, a climate change AI expert, and chief scientist at GainForest.Earth. This is the We Are ETH podcast, and I'm Susan Kish, your host.

So David, it sounds like you literally just got off the plane from Baku. Tell me, is it true? Was it really underneath a stadium in a huge space without much to do or where, actually were the climate change talks held?

[00:00:59] **David Dao:** It was like very close to the stadium, but definitely just a couple days ago, I was still in Baku supporting youth negotiators all around the world, negotiating for what is the climate finance cop basically this year, it was all about how much the developed nations have to pay to the developing nations and that new goal needed to be quantified. It was tough. It was in a stadium close by to it. The hall was much smaller than the last years. Dubai was way bigger than Baku, but it was still nothing less intense.

[00:01:33] **Susan Kish:** I understand. Now, did you stay through to the very end? Cause I heard the negotiations extended longer than they had expected.

[00:01:39] **David Dao:** Yeah. Almost for one more additional day. No, I didn't make it. I left the last day on Friday. And had it back, but I know many of my friends, they stayed until 4 a. m. at night trying to negotiate the last parts of the deal.

Yeah, it's every like autumn, like winter, like as a climate negotiator, this is the most busiest months. And this is also when you're an activist in that space, this is one of the few times in the year where the whole world is coming together to get points straight across. Right. So that is very passionate.

That's very, it's a lot of hard work. Yeah, it's, it's tedious work.

[00:02:19] **Susan Kish:** David, can you summarize what the conclusion was around the climate finance component of this year's COP?

[00:02:25] **David Dao:** Yeah, simply speaking, the agreement is actually full of paradox, because scientists, including ETH scientists, have said that we need at least 1.3 trillion dollars annually to support developing nations and people from the global majority to really tackle like climate adaptation and resilience because of flooding, because of whatever we're going to face in the next couple of years, which is extreme. But we need to discuss a new goal on climate finance and the developed nations.

They were pushing out a goal, which is way below any expectation, which was initially 250 billion dollars a year, which sounds a lot, but it's actually not. And so lots of negotiations in the end focused on can we push that towards the goal that is needed right in the trillions. But in the end, the deal was 300 billion per year.

So the developed nations, including the European union in the states have agreed to push 50 billion dollars additionally, which I think many countries, yes, they agreed on it for the sake of multilateralism because we needed to get a deal out of Baku, but it's definitely an insult I would say for many of these island nations, especially that are going to face tremendous trouble in the next years.

[00:03:53] **Susan Kish:** Can you describe for me, what are the roles of a youth activist? Are you, do you have a seat? Is there a big round table and you guys have a seat at the table? Is it talking to the delegates and negotiators in the hallways? How does it manifest in the process of the talks?

[00:04:12] **David Dao:** I think you're asking the right person.

I'm not really a youth activist anymore, but it has been my seventh COP. I've been attending every single COP since COP 23 in Bonn. And initially with a lot of hope. Then with a lot of frustration and now again, with a lot of hope, I have to say. So quite a traumatic journey, but I started as a, just a day pass.

So as you mentioned, I'm, I'm the chief scientist of GainForest. GainForest itself is a nonprofit and we started actually at COP, at the hackathon, we won the hackathon. We got my, got my first pass to COP and I was just a visitor talking to some people, presenting like the idea...

[00:04:53] **Susan Kish:** This was the COP at Bonn?

[00:04:54] **David Dao:** That was the COP at Bonn.

[00:04:55] **Susan Kish:** You won a hackathon for your work? Oh, that's so cool.

[00:04:58] **David Dao:** Exactly. Exactly. That's, it's all connected somehow. And so that was my first COP where I met like decision makers. I learned a little bit how the whole COP game works. So at COP, basically. It's kind of like, and I'm not a fan of this, but you know, when you go to a conference and people look at the color of your badge, because the color of your badge tells you what role you have in the conference, that happens a lot at COP.

So basically yellow is an observer. So at COP, you can be an NGO observer that observes negotiations, but you're not allowed to enter the negotiations. Then there's the press, of course, that is an orange badge. And then you have pink, which is party member, a party member. COP stands for conferences of parties.

Party members are delegates from the countries, respective countries like Paraguay, like Switzerland, like the U. S. that come in a delegation to negotiate. And if you're a party member, then your badge is purple. And if you have the party hat, your badge is red, which is the most prestigious one. And then you have blue for the UNFCCC people.

So these are all the kind of stakeholders at COP. These are all the people. So climate activists. are in between the observers and the party members.

[00:06:15] **Susan Kish:** Now, if I read correctly, you also were there because the most recent XPRIZE was going to be announced there. Can you talk to us about the XPRIZE and that whole process?

Well, actually, let's go backwards. What happened at this Baku COP? And then let's go back to your engagement with, with the XPRIZE.

[00:06:32] **David Dao:** So the Baku COP GainForce.Earth. We actually not because of the XPRIZE, but XPRIZE came to COP then to present in the Singapore Pavilion. But GainForest.Earth, what we do is we create equitable technologies to support people on the front lines, nature communities, but also people in decision making, because we want to tackle the loss of nature and biodiversity.

And we think there are two reasons for that. There's a lack of incentives in economics. Um, to preserve nature, but then there's also a lack of action from decision makers. So, at COP, we launched, for the second year, an AI assistant called Polly.

[00:07:14] **Susan Kish:** Polly, as in Pollybox.

[00:07:16] **David Dao:** Yes, like in Polly Box, or in Policy Maker, so Polly.

And Polly is a chat assistant that speaks many, many languages. It's open source as well. And it allows, especially first negotiator, first year negotiators or negotiators whose primary language is not English to translate and dissect and analyze really complicated policy texts really fast, oftentimes in their own language.

And so we implemented this tool that is supporting many, many negotiators, 140 negotiators at COP this year to basically do their work better, to come to conclusions better, and to not have language as a natural barrier when it comes to getting your point across, which is unfortunately very, very common, especially for the developing nations.

So that's the main reason that GainForest and I was at COP. And then that's also part of XPRIZE is, I actually have it here. So this is the XPRIZE.

[00:08:13] **Susan Kish:** Oh, that's so cool.

[00:08:14] **David Dao:** Yes. So the XPRIZE has been a five year, 10 million dollar competition when it comes to developing technologies to monitor rainforest in nature. And back in the early days of Gainforest, we thought we would be like crazy enough to win this prize. So we started registering for this prize, not knowing what would be the journey. And then we, we did pretty well. We went almost to the semifinals. So like shortly before the semifinals, we realized that ETH also has a team that also registered.

They had a team leads of Biodiv Explorer back then, the ETH team. And they reached out to me, David, how come you have, why are there two teams in Zurich, like almost like in the quarterfinals, what's that? We should work together. And we talked with each other. We got really well along and we realized each of us has a super great expertise.

Christine, environmental DNA, Stefano in drones and my expertise lies in AI and community building and decentralized science. And I was like, okay, let's get it together. And so we merged our teams to form ETH BioDivX, which then we free co- led over the last two years, first in the semifinals in Singapore, where we competed and tested out our technologies.

Then we were, so initially there were 298 teams. We were the 16 teams in semi-finals in Singapore, and then the next year we were one of the last six teams who competed. So this year in the finals in the Amazon rainforest. And yeah. And then four teams won a prize and we were one of them.

[00:09:55] **Susan Kish:** That is fabulous. Congratulations, David, to you and to your team. And also it sounds like, to the communities that you worked with.

[00:10:04] **David Dao:** Oh, a hundred percent. They were really, really critical part of, of the win, right? Actually, that bonus prize went for the most, single most impactful approach. And technology that was developed during the five years.

So it's a really precious prize.

[00:10:19] **Susan Kish:** So it's the impact prize. Oh, I like that.

[00:10:21] **David Dao:** It's the impact price. Exactly.

[00:10:23] **Susan Kish:** How did you find the community in the Amazon or did the XPRIZE people for this sort of application test, did the XPRIZE people identify that community?

[00:10:32] **David Dao:** No, this is, this is again, me being crazy enough to think that I can just go to the Amazon and find the communities, which is what I did.

But it's not too crazy because one of the things that, um, GainForest is really good at is that we exist for a while now, like five years, two years officially registered now in Zurich. So we have lots of connections with nature communities around the world.

[00:10:59] **Susan Kish:** Plus you hang out with them at COP every year, right?

[00:11:02] **David Dao:** We hang out with them at COP every year. We, we co design technology together. So basically we have to work very closely together, right? And we have calls together. And so we have seats around the world. We have actually 28 communities around the world that GainForest is supporting in the Philippines, Southeast Asia, generally East Africa, and like South America. Initially we didn't have anyone in Brazil except for one NGO, but that didn't work out too well. So we actually leveraged one of the facts that one of the early champions that we supported to come at COP, she was Brazilian. She worked on the ground with communities. And we both just agreed on January this year to host a workshop in Manaus on AI For everyone to come, including indigenous people.

And we hosted it in an indigenous suburb in Manaus called Parque Das Tribos, with 30, 000 indigenous people from 30 plus tribes. And that was a really successful workshop. Really, really lovely. She was my translator, Kamila Camilo. And I, we were holding that AI kind of workshop. And then there was this wonderful indigenous woman looking with very curious eyes at our workshop, but we're telling her about AI and like chatbots, Marina Mura from the Mura people.

And she approached us afterwards and said, this is so fascinating. How can I get involved? And then we actually worked with her over the next months and months ahead. And she became from a workshop participant. Um, our indigenous scientists, we trained her with technologies. We trained her how to use some of the technologies that ETH BioDivX has developed.

She met the team at the finals. She was with us at the finals - pregnant. She was like, she had a baby. Girl, like insane. And then when we won the prize, we thought she's such a hero to us and our team that she gave actually the acceptance speech

in front of our team. So really that's the story of how we connected with the communities.

We came there, we had a workshop capacity building, and then it organically was just a friendship. They invited us to come to their villages. We went there, we did more capacity building and we co-designed technologies together and that's in the end why we won that, that bonus prize.

[00:13:31] **Susan Kish:** That is a lovely story. So in practical terms, right? I think of AI and I think of a huge surge of localized energy requirement. I think of, uh, terrifying views about its use for military purposes. I see it used in ways that question your moral and ethical basis, but I also see the possibility to use it for good. Can you, just in layman's terms, what do you see this as two or three things that AI or these large chat, not chat, but large databases can be used, language models, thank you, can be used to actually positively impact climate?

[00:14:14] **David Dao:** I think one of the things when we look at AI, we have to always consider it to be Um, a tool that cannot be disassociated with the creator. So what I'm saying is imagine you're an architect and you're designing a room and you're, for example, not in a wheelchair. You wouldn't maybe initially think about inclusivity in the room, you wouldn't think about the stairs need to be,

[00:14:38] **Susan Kish:** or the width of the doors.

[00:14:38] **David Dao:** Exactly. The width of the door. You don't know that. Mm-Hmm. very similar to AI. When you are an AI researcher or AI developer and you don't design with the communities, you don't, uh, consider its use cases, you're having a very different perspective than them. Then what you're designing is exactly that kind of not inclusive room. Right? Not accessible room for an architect. Mm-Hmm. , so. AI is really much connected to the designer and his or her mindset. And so much of the danger comes from that as well. Like military uses right now, Israel is using AI to bomb Gaza. Many, many horrible stories that are coming from these. And I think it can be solved with co design, with bringing the right people with the right mindset and to co-develop this technology.

This is what GainForest is about. Large language models are really wonderful in translating languages. And language barriers. The second part we noticed is with co-designing with indigenous communities. The suburb I told you about, they are urban indigenous people. So they lost their homeland and they can still remember their culture, but they remember it barely. And every generation they lose some parts of it. They transmit knowledge through oral storytelling, right? So when you want to archive and collect indigenous and local knowledge, how are you going to do this? You're not going to do this with a form. Because the form is too constraining. So you need a device that can listen and ask questions and listen to stories. And large language models are really great in that. And so we have Polly's sister called Taina, which is an indigenous chat assistant that helps local communities to archive the knowledge, preserve it. Marina calls it her treasure box because all the data is stored actually on her laptop. It's like a, it's runs locally.

And so it helps them basically preserve and collect this information at a much more inclusive way. And also in their own language, they can just speak in Portuguese and then that information gets, gets stored in it. So those are two really good use cases of large language models. And the last one is nothing about large language models, because I want to emphasize the part that AI. It's not just LLMs, but actually one of the criticism of AI is the large electricity costs. But that is because we are so focused on using large language models for everything, right? That sometimes even the simple and small model can do the task much, much better. So for example, one of the things that we're developing in together with some labs at ETH Zurich and also nonprofits is an algorithm that helps classify tree crowns and detect what kind of trees are where. So imagine when a community wants to find a Brazil nut tree. One of these really beautiful and valuable trees that provide you with Brazil nuts and one of the major income sources for a community. You have to usually scout the forest, which takes lots of fossil fuel.

You need to use gasoline for the boat. Then you need many hours or days sometimes to walk through the forest to find these trees. But now with AI, all you need to do. It's just either a satellite image or like a drone image. You fly quickly over it. Costs almost no electricity. Then you run the algorithm. It's not a large language model. It's actually quite efficient and fast. It's a machine learning algorithm, a convolutional neural network. Costs almost nothing in electricity, less than a Google search. And then you have the trees, right? And you would save so much work. And so I think it's all about the trade off of understanding what are the local use cases that you need?

What are the right AI models that are fitting and how can we co design the technology together such that we also understand its potential ethical use cases and also dangers.

[00:18:27] **Susan Kish:** David, this is a wonderful path and this theme of impact and making a difference is consistent across these areas that you work in.

How did your path go from growing up in the Black Forest in Germany to, um, going to college, I think you went to Karlsruhe as an undergraduate and then on to other institutions and then to ETH. How did that path go?

[00:18:54] **David Dao:** I think my path. On this impact,

[00:18:57] **Susan Kish:** Impact journey!

[00:18:58] **David Dao:** Impact journey started even before me. So my parents are actually Vietnamese refugees.

They left Vietnam, they met on the boat. So after the Vietnam war in 1980, when South Vietnam lost the war and the U. S. lost the war against North Vietnam, my family was driven out due to economic reasons and also other political reasons out of their home country. And they fled with the last money. So my mom and my dad, they were in the same refugee boat.

They fled in this fishing boat, hoping to reach Australia because that's basically the path. Actually, 30 percent of the people who tried this journey didn't make it. It's like storms, pirates, diseases, and like shipwreck, right? There was a German ship that rescued my parents from the South China Sea. Yeah, it's a large freighter, like a German freighter, and it was run by journalists and his friends.

Because if you zoom in half around the world in Germany, they were sitting there watching the television unfolding this crisis with hundreds and hundreds of thousands of refugees drowning in the ocean right now, right? And they said they cannot just wait for governments to act. So they took their own time and their own money as friends, and they rented this boat, and they went out there to save people.

My parents and 10, 000 other people.

[00:20:23] **Susan Kish:** Seriously, they rented an ocean, uh, freight ship.

[00:20:25] **David Dao:** Correct.

[00:20:25] **Susan Kish:** And just went around the South China Seas picking up everything. Yes. Oh, that's, wow. Yes. That's an amazing story. And then they brought the people back to Germany?

[00:20:35] **David Dao:** Yes, correct. That's the story I basically grew up with.

And that story in my back of my head is driving a lot of the things that you see today that I'm doing. Right? Like when I go to school, of course, always a little bit with influence of parents, like how it is in an Asian culture. I've been to culture to study computer science, because that's the thing you do to make your mom proud.

But then afterwards, once I get a little bit away from the proximity of my parents, so in Munich, I figured out some of the other topics that I got really interested in, including AI. I happened to get an internship and a thesis at MIT. So I went to Boston to write my thesis on. On AI for medical purposes.

And then I actually happened to stay in the US, worked a little bit, but then I, after my master's, I did an internship in Silicon Valley and I applied for ETH only as a PhD student because I know that I always wanted to come to ETH. That was kind of my

[00:21:34] **Susan Kish:** Why is that?

[00:21:35] **David Dao:** Um, Albert Einstein studied at ETH. He was crazy enough as well.

So I don't compare myself

[00:21:41] **Susan Kish:** He's the poster child of the institution.

[00:21:43] **David Dao:** He is. And initially also, like, the professors were like, who is this guy, right? Like, why is he so weird? And in the end, he, he's the poster child though. So for me,

[00:21:53] **Susan Kish:** that was a good role model?

[00:21:54] **David Dao:** It's a role model. Definitely. It's always been.

[00:21:56] **Susan Kish:** It's a really good role model.

[00:21:57] **David Dao:** Yes.

[00:21:58] **Susan Kish:** So you're in Stanford. So you decided you didn't want to do your PhD out there. You wanted to come back to Europe and study at the ETH. Yeah. Was there a professor you wanted to work with? Or was it the institution itself? What caused you to say, that's my beacon, that's where I'm going to go?

[00:22:12] **David Dao:** Oh no, I love Zurich. So Zurich is the most beautiful town in the world. I've been to many places now, but I still think nothing beats the mountains, the lake, even like the Swiss people and the, just the air and nature itself. It's so stunning. So when I applied for ETH, it was also secretly to just live in Zurich, but also because of my role model, Albert Einstein.

And so I was like, okay, there's no discussion. I didn't even apply for any other universities. I was like, I know exactly what I want.

[00:22:43] **Susan Kish:** How did the ETH prepare you for what you're doing?

[00:22:46] **David Dao:** ETH itself, I think, is such a colorful institution in many ways. It has people from all spaces in the world that really, I collected many beautiful friendships during my time at ETH.

We both. Shared laughs, but also like stressful moments as any academic career is.

[00:23:07] **Susan Kish:** Of course.

[00:23:07] **David Dao:** And I think having this really, really strong network and bond together really helped support a lot. It also helps for the credentials. ETH is a very famous university. When I tell people about the ideas that I have, I think if I wouldn't be at ETH, they would consider me a little bit like a dreamer.

I'm sure they still do, but ETH really helps, helps put there like a certain kind of label of trust that you can trust this guy, he knows what he's doing.

[00:23:35] **Susan Kish:** So as an individual, how can somebody who shares your objectives, who shares your mission, who shares your vision. What can an individual do to support the cause?

[00:23:45] **David Dao:** We as people already know, okay, eating meat and also certain kind of lifestyles are my, maybe less sustainable than others. But I think the single most important thing that we can do is to understand that it's not our fault. It's not the single individual footprint that is causing that mess. It's the fossil fuel industry itself.

That is actually trying to make us believe that it's our fault. And so they secretly can continue polluting. The only thing to tackle fossil fuel industry is to raise awareness that the major CEOs and this companies are the ones at fault and they need to, they cannot continue hiding, right? They are very successful with the marketing campaigns and greenwashing campaigns to hide.

And try to give the blame to others, but actually it's them who need to change. And so there are two ways people can tackle this first, be aware and raise awareness of the fact that fossil fuel and the fossil fuel industry needs to change and keep them accountable. That means like either you, you do anything on the demand side to incentivize less fossil fuel consumption.

Just don't give them your money, right? Because that's literally what they are after. That's what they're literally after. And that's why they're ruining the planet. And the second part you can do, is you can go to the streets, you can make your standpoint to governments and leaders, and also the fossil fuel industry, that we have not forgotten about the climate crisis.

That yes, we are living in a polycrisis times, but the climate crisis is arguably the most urgent of all of them. And we have not forgotten about this and we need to raise awareness on a much broader scale in the political spectrum, as well as on the streets, as well in activism, as well in arts, policy, diplomacy, science.

Yeah, exactly. And just listen to our scientists. Damn it. We are like at ETH, we're doing great science. So I think just simply doing our best to raise awareness and say, okay, listen to the science, please act. I think it's the most impactful thing people can do now.

[00:25:56] **Susan Kish:** So it sounds like be educated, be informed, be hopeful, and take action.

[00:26:02] **David Dao:** Absolutely.

[00:26:03] **Susan Kish:** Fantastic. David, thank you. That was a great conversation. Really appreciate you joining us.

[00:26:09] **David Dao:** Thank you so much for the invitation and also lovely conversation.

[00:26:13] **Susan Kish:** So David, I'm going to close by asking you a few questions we ask all of our guests. So the first one is, when you were a little boy.

What did you want to be when you grew up?

[00:26:23] **David Dao:** So when I was a little boy, I wanted to become a physicist.

[00:26:26] **Susan Kish:** A physicist?

[00:26:27] **David Dao:** Because Albert Einstein was a physicist, right?

So I'm not too far off, I have to say. It's still, it's very technical, very sciency. I think Albert Einstein would have become a computer scientist in modern days.

[00:26:41] **Susan Kish:** If he had to choose a thing to do today. And what are you curious about? What are you learning these days?

[00:26:49] **David Dao:** I think, of course, my background in AI research.

It has been such an interesting time to Mm-Hmm , watch the field explode and come up with new ideas. So I learned a lot just following other researchers work on the AI frontier, but also at the same time I discovered a complete novel resource of knowledge, which is the local knowledge and indigenous wisdom of the communities that I've worked with that I think is so beautiful.

And I want to translate into a language of science that can benefit both in bridge. scientific expertise and local knowledge in a more fair way. So I think those are the two things that I'm learning the most from nowadays.

[00:27:31] **Susan Kish:** And what books are you reading on your bedside table, on your Kindle, on your phone, or listening to?

[00:27:39] **David Dao:** So I have to say that I, my favorite book is [Matilda. Have you, from Roald Dahl?](#)

[00:27:45] **Susan Kish:** Of course.

[00:27:46] **David Dao:** Yes. And I do happen to read Matilda once in a while again, and you just caught me. In the moment where I have it in my book side, yeah, so I really love Matilda.

[00:27:56] **Susan Kish:** Fabulous. And you mentioned that going to visit Zurich back in 2008 and now today.

What is your favorite place to go?

[00:28:05] **David Dao:** I recently picked up my sailing license. So I would say it is a tough test. And it was like, yeah, wonderful learning journey as well. And I would say my favorite place right now is on the sailing boat on the Zurich Lake. I think this is such a special thing.

[00:28:19] **Susan Kish:** That sounds fabulous. And sounds like a great thing on a lovely summer eve with the sunset. David, thank you so much again.

[00:28:29] **David Dao:** Thank you so much.

[00:28:30] **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.

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