WE ARE ETH – Episode 41

With Wim Thiery, ETH Alumni, Climate Scientist and Associate Professor at the University of Brussels

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[00:00:00] **Wim Thiery:** **There is not only this injustice between generations, but there's also this injustice across regions whereby children in poor countries in low income countries, are hit hardest.**

[00:00:16] **Susan Kish:** In this episode, I'm talking with Wim Thierry, ETH alumni and an associate professor at the University of Brussels, a climate scientist, modeling extreme events in a changing climate. I'm Susan Kish, and this is the We Are ETH podcast.

I understand, although you're based in Brussels, you're actually in Zurich today. Is that right?

[00:00:41] **Wim Thiery:** That's correct. Yeah.

[00:00:42] **Susan Kish:** What brought you to Zurich?

[00:00:43] **Wim Thiery:** I used to come from time to time, even though I've officially left ETH, but I'm coming home from time to time to, to meet the scientists. And, and yeah, this particular week I was invited to give the colloquium of the Institute of Atmospheric and Climate Science. So that's the department and the Institute where I worked.

And I was asked to give a seminar there to the master students and the researchers that are working there and to present my latest research to them.

[00:01:09] **Susan Kish:** Fantastic. So now you're going to have to tell me what the seminar is about.

[00:01:15] **Wim Thiery:** Yeah. So the title of the seminar was, will you live an unprecedented life? And so it links to the, one of my core research lines that my team and I are working on in Brussels, but actually it's work that was sparked by the research done at ETH. And that's where we look at intergenerational inequities in exposure to climate extremes.

So what we in essence do is we calculate the total number of heat waves, of droughts, of floods that a person born in a particular year and in a particular location will experience across their lifetime. And this allows us to compare the exposure to these climate extremes across generations and across regions.

And so we calculated that and I was presenting those results to the colleagues.

[00:02:02] **Susan Kish:** Very cool. So it's sort of flipping, changing the perspective, right? To a cohort by age. And if I understood correctly, I just, I saw the scientific American summary of this one, right? But I think your conclusion was something like children born in 2020 are two to seven times as many, as higher possibility of extreme events than those born in the 60s.

[00:02:28] **Wim Thiery:** Yeah.

[00:02:28] **Susan Kish:** Which is rather dramatic.

[00:02:30] **Wim Thiery:** Yeah. So in a study that we published two years ago, and which was also, which originated from working at ETH, was calculating this number of, for example, extreme heat waves that you will experience across your lifetime and comparing generations to each other. And for example, we find that children born in 2020 will experience four times more extreme heat waves compared 1960.

And this is under one and a half degree warming pathway. So this is the most ambitious of possible climate scenarios. If you look at the current pledges, what countries actually proposed to do today in terms of climate action, we find that grandchildren will face seven times more extreme heat waves compared to their grandparents.

[00:03:11] **Susan Kish:** And actually, I think the Copernicus Institute just came out saying this was the 10th record breaking heat month at 1. 68 degrees. In other words, we've popped through the 1. 5. Does that mean the 1. 5 is out of scope, or does that just mean we're having a heat wave?

[00:03:30] **Wim Thiery:** Yeah, so I've multiple things to say here about this. Indeed, we are doing this research against the background against an outside world with where records are being smashed all the time, and we are seeing records being shattered. We are seeing ocean surface temperatures rising to,

[00:03:47] **Susan Kish:** Crazy levels!

[00:03:47] **Wim Thiery:** Crazy record values for one year in a row. Now we are seeing air temperatures rising. We are seeing extreme heat waves everywhere. And indeed, we have seen temperatures of individual months, but also now for one year in a row, 12 months in a row, temperatures being one and a half degrees above the pre industrial level. So one and a half degrees warmer compared to the beginning of the industrial revolution.

Now, this does not mean that the climate has warmed by one and a half degrees, because for the climate to warm, you need to have the average across, say, a 20 year period to be one and a half degrees warmer. But the past 12 months do tell us is how an average year would look like in a climate that is then, one and a half degrees warmer.So it's really exceptional what we are living through. This has huge impacts all over the world.

[00:04:41] **Susan Kish:** That's very helpful context. Let's go back to this question of cohort. If you can cut the cake as you look at it by generation, could you also cut it by gender, or geography, or how many ways could you cut that cake in, in terms of doing that modeling?

[00:05:00] **Wim Thiery:** What we did in essence is making a data cube, a whole bunch of numbers that calculate for every generation. Every country of the world and every possible future warming scenario, we calculate how many heatwaves, droughts, wildfires, river floods, tropical cyclones and crop failures this person living in that country and under that scenario will experience.

And so in that sense, it gives us a data cube with four dimensions and we can cut

[00:05:30] **Susan Kish:** What were four again?

[00:05:31] **Wim Thiery:** Can

[00:05:32] **Susan Kish:** Well, it was country.

[00:05:34] **Wim Thiery:** Country, birth year, future warming scenario, and then the category of the climate extremes, one of the six. So we have actually, if you like,

maybe a data cube in three dimensions, but we have six of them. One for each climate extreme.

That's maybe another way to put it. Yeah. And then we can analyze them from every direction. And for example, we find that a person born in 2014, that's the age of the, that's the birth year of my oldest son, Loic, that this generation under a three degree warming pathway will face twice as many wildfires, twice as many tropical cyclones, three times more river floods, four times more droughts, um, five times more crop failures and 36 times more heat waves, um, compared to living in a world 36 times more heat waves compared to living in a world without climate change.

[00:06:24] **Susan Kish:** Why is everything else just by a small number and heatwaves are like by 36?

[00:06:30] **Wim Thiery:** Yeah. We find the strongest increase in general for heat waves. This is well known, let's say in the climate science community that we have the strongest response in terms of number of heatwaves in terms of their rise, both in their counts, so their frequency, but also their duration, how long they last and how warm they get their intensity.

So heatwaves are responding very strongly. And if you realize that three degrees is actually the pathway that we are currently heading given actual climate policies implemented on the ground today, you realize this is actually the future that is waiting for our Children today unless we step up unless we take more bold climate action unless we increase our ambition.

This is what these, these children are wait are is lying ahead of them. And this is the global average because you asked me about geographies, but there's different regions in the world. And we find, for example, that children born in the Middle East and North Africa are facing the strongest increases. If you're born in, if you're under 25 in the Middle East or North Africa, you will experience at least seven times more climate extremes under current pledges, what the country's promised to do, compared to world without climate change.

If you're born today in that region, you will face at least nine times more climate extremes. Compared to living in a world without climate change. The second most hard hit region for young children, after the Middle East and North Africa, is Sub Saharan Africa. And so, you already start to realize there is not only this injustice between generations, but there is also this injustice across regions, whereby children in poor countries, in low income countries, are hit hardest.

And this is problematic for three reasons. First of all, these children in poor countries, they hardly contributed to the problem because they hardly emitted any greenhouse gas in the first place, right? Second, they are amongst the most vulnerable when it comes to the exposure to these climate extremes turning into real impacts on their lives because they live in houses that offer poor protection against extreme heat or hurricanes, or they live in families that depend on agriculture for their livelihoods.

So when the climate extreme happens, it has a direct impact on their lives. And the final reason why this is important is that today there's a large number of children that are being born in these hard hit countries.

[00:08:47] **Susan Kish:** In other words, the birth rates are higher in those countries.

[00:08:50] **Wim Thiery:** Exactly. Birth rates are high. Yeah. If you look at 2015 to 2020, there were 64 million children born in, in, in Europe and central Asia, including my middle son and those 64 million children on average will experience four times more climate extremes under current pledges. But in the same period, we have 205 million children that were born in sub Saharan Africa.

And those 205 million children, they won't face a fourfold but a sixfold increase in extreme event exposure. So not only does the average child in that region face more climate extremes, there's also many more children today that are in that situation.

[00:09:26] **Susan Kish:** You know, what's interesting about that is that these insights speak to really two things. One is the urgency of action around climate. But the second is the urgency of adaptation, right? If realistically we expect this rate of increase, and the, the US federal government, I'm in Washington DC right now, just submitted a report that's required, uh, along with a budget about the potential impact in climate issues.

And the number of incidents is comparable to what you're talking about. But their argument is to say, and as a result, we have to do things like invest more in infrastructure, invest more in transportation networks, make our systems more resilient. So in other words, it, it feels like the, the action that your research is indicating really is on both sides.

It's reducing climate and it's getting better at resilience and adaptation.

[00:10:25] **Wim Thiery:** Exactly. I mean, if you think about combating the climate crisis, there's different things we can do. And you see that there's essentially three pillars when it comes to tackling the problem. The first one is tackling the problem at the root cause by reducing our emissions of greenhouse gases. So we have to do mitigation, which means decarbonizing our economy, our society.

And we have today the technologies to do that. And we have the financial means to do that. Calculation estimates are around 2 percent of global GDP needed in terms of investments to limit global warming to one and a half degrees. Now, the interesting thing is, if you do that, if you invest in mitigation in decarbonization, you are going to avoid some of those negative consequences by avoiding the climate to warm in the first place.

Now, there are estimates that are around, Suggests that for every dollar or euro or Swiss franc that we invest in mitigation, we gain one and a half to 3. 9 Euro, Dollar, Swiss Francs in terms of avoided damages.

[00:11:34] **Susan Kish:** That's pretty dramatic.

[00:11:35] **Wim Thiery:** Um, that's a study that only incorporates the known costs because there's many other costs that are not factored into that calculation.

So it's the conservative estimate. It's at least that much of, of, of damage and suffering that is avoided. And so I think that's the most important that we focus on decarbonizing as quickly as possible. It's the most cost efficient thing to do. The second is that we, we have to start thinking about adaptation because even we realize that even today in a 1. 2 degree warmer climate, our infrastructure, our health, other aspects, we are not adapted. Even to today's increasing climate extremes that we've had so far. And, and 1. 5 is the most optimistic one. So we will need some adaptation, but the more we mitigate the less, the less money we will need to put in adaptation.

And then the third pillar is, uh, loss and damage because we have a international historic responsibility as high emitting countries towards the global south, who are today already suffering and who depend on that financial support to, on the one hand, decarbonize, but also adapt. And so these are the three pillars of climate action and that are also part of the international climate negotiations.

[00:12:54] **Susan Kish:** Wim, if folks want to understand this impact of climate on their generation, this intergenerational cohort research, you had mentioned a website. Can you talk to us about what that website is? Tell us the link and what's, what is the functionality you can achieve?

[00:13:12] **Wim Thiery:** Sure. So we have actually developed a website called myclimatefuture. info. And if you surf to that website, you can enter your birth year, um, your location and select a possible future warming scenario. And then you automatically get. the results of what climate change means for you as an individual.

How many more of these climate extremes can you expect across your lifetime compared to world without climate change? So myclimatefuture.info is a website where you can learn what climate change means for you.

[00:13:42] **Susan Kish:** I'm going to ask you about AI. Generative AI is really interesting in this context. I think I saw you had published a paper about developing models that can use natural language processing and newspaper reports to start to really build out data about extreme conditions. weather events. At the same time in the U. S., for example, the power demand that's anticipated to do all this modeling is, the surge of power demand is just huge. How do you reconcile these and what is the potential impact of all the work being done with AI on these issues of climate?

[00:14:17] **Wim Thiery:** For us as researchers, we are learning and finding out that using AI really allows you to tackle research questions that were not possible to be addressed before. And it allows us to improve our, our, our, our computer models that we use. It allows us to predict the future climate and project future climate.

Just to give you three examples, we are mining Wikipedia with ChatGPT to, to develop a new database of the impacts of climate change. How many heat wave occurred in the past? What was the economic damage of river floods? How many

people died in hurricanes? What we are also doing is we are, uh, digitizing paper records of, of weather stations.

So we went to Congo, uh, DDRC in Central Africa where we took pictures of, of Metrological sheets of paper where temperature was recorded for, for years and years on paper. And we are now using AI to turn this into basically Excel sheets that can be read by by machines and that can be used to improve our computer models and our understanding also of climate change because we are blind when it comes to Central Africa from that perspective. It's a very positive story I would say.

[00:15:31] **Susan Kish:** We talked about the cohorts and how the future impact of climate will affect the children born today, the children born 10 years ago. 20, 30, 40 years ago with the assumption that no matter what we do, it's going to have a bigger impact going forward. How do you prepare the children? How do you prepare the kids of tomorrow, whether they're children or whether they're young adults for that role and that responsibility?

[00:16:02] **Wim Thiery:** Actually, I mean, the science is crystal clear. We understand the problem. We understand the causes of the problem, but the science has already delivered on the solutions. We have today all the solutions. We have windmills, we have solar panels, we have electrical cars, electrical buses, electrical trucks. We have isolation for our houses.

We have all the solutions today on the table. And so saying, yeah, we need those children to, to, to help us solve the problem. I think it's putting a burden on them that they do not deserve. It's actually. running away from our own responsibility as adults. So what I would say, my message would be, we have the technologies today.

We have the financial means to address the problem. What we need to do is implement the policies that accelerate the implementation of those climate friendly technologies and also implement the policies that foster climate friendly behavior and discourage climate change. Uh, polluting behavior, and by this we can solve the problem by the time our children get adults.

And if we do anything else beside that, We are failing on our own children.

[00:17:08] **Susan Kish:** So let's just talk briefly around the questions around litigation, because you wrote a really interesting paper around the role of climate scientists in litigation. There was just a court case in the European Court of Human Rights against actually Switzerland that was decided. And it was decided that the Swiss government had not taken sufficient actions around their climate commitment.

Certainly all the litigation around Shell in the Dutch courts, this litigation, the US courts, just a few words. What is the role? What do you think the role is of climate scientists on it? Because otherwise, is it just as the expression goes, an academic? What are the actions that academics, or let's say even an institution like the University of Brussels or the ETH, can tangibly take?

[00:17:58] **Wim Thiery:** It's a good point and there is that we are now since a couple of years facing a wave of climate lawsuits whereby citizens or NGOs are taking governments or fossil fuel companies or banks to court for either their lack of sufficient climate action or for their historical emissions which have already Caused damage and suffering and asking for repair for those and the Netherlands and Belgium, France, Germany, Czech Republic, they've all been convicted already.

And we have every week, we have new cases that are starting all over the world. Uh, also the Montana case in the U. S. Was very famous whereby young children have been suing the state of Montana. And now the state is obliged to take climate change into consideration to the Indian legislation. And There is a role of climate scientists to play here in the sense that scientific evidence is critical in informing these lawsuits.

And many of them rely on the IPCC reports, which are the United Nations reports on climate change in which scientists from universities like the University of Brussels and ETH are heavily involved in developing these reports. I had a very small role to play in two of these recent reports.

[00:19:12] **Susan Kish:** You have an illustrious, for lack of a better term, academic career. Right? Having studied at, um, University of Brussels, the University in Leuven, studying philosophy, climate science, and geography, a topic very near and dear to my heart. How did you, how did you pick geography and climate science? And then what was the path that got you to the ETH to do a postdoc?

[00:19:37] **Wim Thiery:** When I was 17, there were many different things that interested me from medicine to physics to law, history. And so in the end, I went studying philosophy because it has a bit of everything and that's how I ended up there. And I started studying in Brussels, but I quickly realized that I was really missing the natural sciences.

And so I started studying geography in parallel, also at the University of Brussels. And then later on. Um, in my master's, I did my master's in philosophy at KU Leuven in Belgium and then did the joint master program in physical geography between KU Leuven and the University of Brussels VUB. And it's at that time that I was first, that I first got to ETH because I did an Erasmus program.

to the Institute of Atmospheric and Climate Science, IAC, which is a world leading climate research institute at ETH. And I followed courses there by very famous climate scientists, including Professor Sonja Seneviratne, who is an expert on climate extremes and the role of land in the climate system. And so when I then continued on my, in my PhD at KU Leuven, I stayed in touch with that team.

[00:20:47] **Susan Kish:** So what was the influence of ETH on your research, on your topics, and now on the direction of the work that you do?

[00:20:55] **Wim Thiery:** It's been tremendous. So there has been a huge impact and what I learned in my studies was the basics of the problem of the physical science basis of climate change and how the earth system functions. I got the understanding

of all the processes. In my PhD in Leuven, I learned the skills and the tools to the research and culminated into, into what I learned at ETH, big questions.

And you ask, you identify the big sign, the big gaps, the big scientific questions in the field, and then you bring in the gold standard tools. To address these. And so this really, yeah, I would say my time at ETH and in addition beside this personal development, let's say, I also found myself here working in a team where they were extremely smart people, extremely motivated people.

And I learned so much from them. And these people that were also in that group at the time have now moved on to take also professorship positions. in different places in Europe, and they're my friends. And now we have a network of climate scientists that all work together at that same moment in time in Zurich at ETH, and that are now formed a network across Europe.

And we continue to work with that network.

[00:22:18] **Susan Kish:** This has been a great conversation. Thank you. And hearing about your story and the landmarks and the work that you're doing has been Really fabulous. Wim, thank you very much. I'm going to close by asking you some of the questions we ask all of our guests. And the first one really has to do when you were young, what did you want to be when you grow up?

[00:22:41] **Wim Thiery:** An astronaut.

[00:22:42] **Susan Kish:** Excellent. You know, there's a great program in astronauts in space now with ETH, right?

[00:22:48] **Wim Thiery:** Yes, I'm aware of that. Yeah.

[00:22:50] **Susan Kish:** Is there any topic or area that you're particularly curious about today that you are learning about?

[00:22:56] **Wim Thiery:** I'm learning a lot a lot these days, because we have collaborations with human rights experts, international law experts, um, because climate lawsuits, climate litigation is exploding. There's a wave of lawsuits and the experts on the law side, they realize that then they need the input of the scientists in these matters.

And on the other end, we are seeing this new development as a potential way to accelerate climate action and the transition. And so we are also eager to to learn about this and to do research on that, and we are coming together as two communities that were completely siloed before, and we are as a network coming together, and I'm learning a lot of that these days.

[00:23:37] **Susan Kish:** So, books. What books are you reading right now? And they don't have to be the serious, non fiction, scientific texts, right? It's just, what's on your bedside table?

[00:23:49] **Wim Thiery:** Okay, so there is a climate science book on my table at the moment. It's the New Climate War of Michael Mann. So Michael Mann is a very famous climate scientist from University of Pennsylvania. He explained some of the tactics that fossil fuel companies have been applying in past decades to delay climate action, for example, by putting the responsibility of climate change on the individual.

It's your fault because you have a carbon footprint, an ecological footprint, that we have climate change. Actually, the ecological footprint concept came from BP, a fossil fuel company.

[00:24:22] **Susan Kish:** You drive car.

[00:24:23] **Wim Thiery:** Yeah, you drive. Yeah, exactly. And also comparing that with the delay tactics of the tobacco industry, for example. So that's on my table right now.

I've, before that I read the Angry Weather, which is a book explaining Extreme event attribution. So that's a field of research that we are working on, but it's a popularizing book that explains the science of when an extreme event happens outside that how scientists come in and tell the public, inform the public of To what extent climate change has increased the probability or the intensity of that event and that's actually a very young field of research But it's gaining a lot of traction And then perhaps a non not directly at least related to climate science is What I read before was the invention of nature which is the invention of nature, which is the biography of Alexander von Humboldt, who was, uh, one of the founding fathers of geography, actually, and also was the first person to identify the concept of climate zones. But it's a book about his life and his adventures.

[00:25:22] **Susan Kish:** Wim, thank you so much and the best of luck with your research and making a difference.

[00:25:28] **Wim Thiery:** Thank you very much.

[00:25:30] **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.

The people who were there, the people who are there, and the people who will be there. Please subscribe to this podcast and join us on whatever platform you listen. Give us a good rating on Spotify if you enjoyed today's podcast or Apple or YouTube. And to close, I'd like to thank our producers, LA Media and the ETH alumni. And thank you, our listeners, for joining us.

Links to topics mentioned in the episode:

Books

- New Climate War by Michael Mann

- Angry Weather by Friederike Otto