URL: https://ecorner.stanford.edu/podcasts/tech-food-and-a-more-sustainable-future-emily-ma-google/

Technology can help solve our sustainability challenges, but partnership across sectors is required to implement solutions at scale.

Our first episode features Emily Ma, head of special projects in sustainability, real estate, and workplace services at Google. Delve into Emily's journey as an intrapreneur focusing on sustainability within Google's internal operations, particularly in the realm of food systems. Learn about the unique opportunities and obstacles she's encountered in building a more sustainable future. Gain insights into the entrepreneurial mindset, the intersection of technology and agriculture, and the importance of holistic approaches in addressing global challenges. Hosted by Mike Lepech, professor of civil and environmental engineering at Stanford's School of Engineering.

Transcript:

Emily Ma:

Fall in love with the problem and not the solution because the solution that you come up with 99% of the time will not be the right one. You'll get the timing wrong. Something might not be right about it, or it doesn't get traction for whatever reason. You fall in love with the problem, you'll continuously come up with new solutions. It will free you to let go of the solution you have in front of you and allow you to pivot more quickly to something that works.

Mike Lepech:

Hi, and welcome back to Move Fast and Fix the Planet. I'm Mike Lepech, professor of Civil and Environmental Engineering at Stanford, an associate faculty director of STVP, the Stanford Engineering Entrepreneurship Center. STVP empowers aspiring entrepreneurs to become global citizens who create and scale responsible innovations. One of the ways we do that is with this podcast where we talk to different experts about entrepreneurship and climate and sustainability and what's different about it, if anything, from entrepreneurship in other spaces. Sometimes entrepreneurs are founders and sometimes they're intrapreneurs working with a company to innovate and drive change.

Today we're talking to intrapreneur, Emily Ma, who's head of special projects in sustainability, real estate and workplace services at Google. Emily's longtime passion has been helping Google step up where it can contribute across all of its business units to a future food system that is sustainable, nourishing, and equitable for all. Emily's work on food systems started at X alphabet's moonshot factory where she led a number of early stage moonshots as well as food systems moonshots focusing on reducing food waste and food insecurity, and increasing data openness in our food system. She also helped bring a range of breakthrough technologies into the world, including Loon internet balloons, and Glass smart glasses.

Emily started her career as a mechanical engineer at IDEO during which she came to embrace the equal importance of human-centered design, engineering, and business. She holds a BS and MS in mechanical engineering and an MBA all from Stanford. She also teaches in Stanford School of Engineering and can be heard on one of our other podcasts, Entrepreneurial Thought Leaders, the Stanford Seminar for Aspiring Entrepreneurs. Welcome, Emily.

Emily Ma:

Thank you, Mike.

Mike Lepech:

Well, we are so excited to have you here today to talk about all things food and entrepreneurship and sustainability as it relates to our core thesis around this podcast, around the ways in which we think entrepreneurship and entrepreneurship is different in the climate and sustainability space. And given that you work for a startup called Google, we think you'd have a lot to say about this. So we will get right into it. And your most recent work at Google focuses on food sustainability, and now more broadly on sustainability within Google's internal operations. What inspired you to pivot your career towards addressing sustainability challenges after being at IDEO and your training in mechanical engineering? And how do you think the work that you do is similar or different to the stuff you've done earlier as it relates to moonshots, like Loon and Glass?

Emily Ma:

Such great questions. So I would say at least in this decade, if not longer, for those of us who are creative people, designers, systems thinkers, there's nothing more interesting than climate right now. Every single person on earth is experiencing something associated with climate. I still remember the day, I don't know if you remember this, it was in the middle of the pandemic. There was one day in the Bay Area where the sun did not come up.

Mike Lepech:

The day the sun rose. Of course

Emily Ma:

It was the whole entire sky was orange.

Mike Lepech:

New York just had its own.

Emily Ma:

Yeah, exactly. So it's no longer this thing that's far away. It's no longer this thing where it's like, if you're on the coast, you experience hurricanes. But if we're here, we'll never experience it. Everyone is experiencing some impact from climate change. So it is one of the most exciting times, I think, for those of us who have looked for ways to contribute to humanity in the world. It's one of the most complex problems that exist. I came out of a world where I was very well trained at Stanford to leverage frameworks and processes to become a better designer, a better engineer. There's nothing more valuable than the scientific process in structuring how to shape a problem. And then similarly, design thinking is the scientific method for designing for human beings. So I became a much better designer and engineer through learning how to use those frameworks.

And now it's take that up a notch or take that up by 10 notches and apply those skills to these incredibly integrated, complex and even chaotic problems that are so multifaceted. Sometimes I compare designing this pen to solving air pollution. Designing this pen, there is a template for this already. I guess pens have been around for long enough that I think most of us could probably figure out how to make one. There's not a lot of chaos involved. It's a simple problem. And yes, these are exciting and interesting to do and also very satisfying because you can do it. It's like there's a recipe, but I actually think that the creativity and our human potential is being challenged right now, and we're being asked to step up because of the complexity of the problems that we're facing. So as daunting as it is, as anxiety producing as it is when the sun doesn't come up, I think it's a really exciting time to be alive.

Mike Lepech:

So one of the things I'd like to ask you about in that regard is that currently we're teaching a seminar class, asking the question, big companies versus startups in trying to address the climate and sustainability challenge, and really digging deep around the benefits of addressing these challenges at a large company where you have to be an intrapreneur, or by doing it by creating your own startup and then going through the entrepreneurial pathway. And you talked about how this is an incredibly multifaceted and interdisciplinary problem.

At startups, we tend to not have tons of resources to do really complex and multifaceted things at big companies. We have those resources, but they can be challenging to muster because of lots of other priorities. So where do you fall on this? Not that it is a Boolean question, one or the other. Is it the big companies that are going to do this? Is it the small companies that are going to create the innovations and then they're going to scale up through them? How do you view this happening given the fact that you're at a relatively large firm right now? Where do you fall on that?

Emily Ma:

So it's not a bullion question. So to your point, I think we need both, and I think we need everything in between. I think it's more like a spectrum. And for me, I've been at Google for about 10 years. The company just turned 25. It's super interesting how it started by the way. You could go on Google Maps and actually go and visit the garage that Sergei and Larry built the first Google Global headquarters. It's completely hilarious by the way.

Mike Lepech:

Of course just outside of STVP here on campus, we've got the first server which has the Lego design it and all kinds.

Emily Ma:

That's right. You know a lot more than actually a lot of people here at this point. So I think the cool thing about a place like Google is that while it is a very big company, I mean it's massive. It's six times bigger than when I started 10 years ago. Going back to that interdisciplinary work, I have reinvented myself here probably six times, and I can probably find an expert who is a sub expert of a particular topic somewhere amongst this universe. It's like Stanford University. It's like the academic setting.

And when Larry and Sergei founded the company, they really intended it to be modeled after Stanford where they would just randomly go sit in on a psychology class or a Greek history class because they thought it would be interesting. So they created Google in the image of Stanford knowing that this is the vibrancy that was needed to solve some of these really complex problems over time. They didn't know that that's what they were going to do after they got Google, and its cord going. But I think it's benefited them a lot to create this place. So I choose to stay here for number one, that reason. I actually truly believe I can within one or two steps find the person who's the fricking world expert in any topic.

The second reason for it is it's like a giant lab. So for any entrepreneur, one of the hardest things to do is to get runtime. I think most of us when we're working on climate, there's probably some physical aspect to it. Even if you're a data company working in climate, at some point your data has to come from some operation and food and ag. You're probably going to be working with farmers on a farm, or you're going to be in a warehouse or a processing center working with machinery. You're going to have to find some connection to the actual supply chain and systems at play.

All of that is inside here. And it was shocking to me because my first, you could call it customer or investor, was actually Google's own kitchens. So when I started learning about food, I tell this story quite often because I could have built a company on my own on the outside. I literally walked downstairs and I knocked on the door to the back of the kitchen. I was like, "Hey, after lunch or before lunch, could I just hang out and sit in the back with you guys as you work and learn about what you're doing?" They're like, "Sure. Wear a hairnet, put on some non-slip shoes and please don't hurt yourself."

So Google is a giant lab. So whether it's kitchens, I think we have hundreds of kitchens all around the world now, or right now I spend a lot of time thinking and learning about how to change the built environment. We are in 200 cities with buildings of all sorts, like hundreds of buildings. So if I'm trying to think about a topic like building decarbonization, a living lab, and I can literally experiment whether it's on hardware or software or some other aspect, even policymaking. I've been experimenting with policymaking in the recent days. This is a giant lab for me, and that's a wonderful thing for an entrepreneur to try to get things going

Mike Lepech:

Well, so if you can comment on how you think that works at other big firms, Google is a very unique and very dynamic tech company that's tackling a wide array of problems including food and transportation and mobility and a variety of things. A lot of either consumer packaged goods or firms like this that are also in the food and ad tech based. Do you think they have an ability to have that same approach? Can folks working at those firms do the same types of things?

Emily Ma:

Absolutely. So I'll give you an example where I have a really good friend who's now a colleague who literally was an entrepreneur in the Department of Defense. If you can think of a very possibly conservative organization that is very tight-lipped about who knows what and can't really navigate, you got to stay within your walls. Department of Defense is probably pretty good example of that.

Mike Lepech:

I'd agree with that.

Emily Ma:

So Joshua Marque basically built a design thinking group within the Department of Defense, and he did it by just being super open-minded, and making friends at the water cooler. So I think he befriended the human resources department and figured out that they could redesign the recruiting process for the Department of Defense with design thinking. And then another just part of the organization caught wind that they were really successful in really having a good time doing it. So they called up Josh and they're like, "Hey, could you help us reinvent how we build tanks?"

Mike Lepech:

It's not much the organization, it's the individual and how you want to view your role and what you want to do within it.

Emily Ma:

Exactly. And I actually do believe that each and every one of us, whether we're in a small company, whether we're in government, whether we're like educators, sometimes we draw artificial boundaries for where our playground stops and starts, and it's just not true. I think people are people, and when we meet others in very different domains, we never quite know whether or not there's an opportunity there. And more often than not, there is something where we agree on and something that we could play with and start to explore together.

So I know I work at a very unique company where our staff are pretty outspoken about topics they care about. So I tend to find free cycles all over the company when... I actually don't like running big teams. I actually much prefer to influence people around me just indirectly. And I think the alignment is much stronger when people show up because they want to, not because they're explicitly rewarded or told by their boss to do things. But I think even in a CPG company, I've seen it happen with friends at P&G or financial companies where a group of people will find each other because they care about a specific topic, and it often times is climate in these days. And they'll find a way to learn together, and then they'll find a way to act together and they'll find a way to move together.

And eventually things take hold, and then the company endorses it because they know it's good for their business and it's good for their staff. So it requires the courage to take the first step to maybe have a

conversation with somebody who you might consider a stranger or in a domain where you just absolutely know nothing about. So it's a little bit of a exercise to be an entrepreneur.

And I think if I go back to your comment, like big company or small company and what sector, I would say with small companies, I think the startups that I've seen that are most successful are not necessarily ones that are working the hardest, that are with five people at a really small scale. It's the ones that are actually connected to other startups that are also doing similar things or in adjacent domains, and they find ways to collaborate and do more faster, further together. It's not the ones that are in a silo working really hard. It's really the ones that are connected to a broader ecosystem. And I think that's why I encourage entrepreneurs who are founding their companies to go join accelerators or participate industry groups, or connect themselves with other organizations, whatever sector they may be in to see how they can do more together.

Mike Lepech:

Yeah. No, I think that makes tremendous sense and really fits with the ecosystem feel of Silicon Valley or other types of ecosystems. I want to touch more on a memory that you brought up. I think for those of us that live in the Bay Area, we definitely remember the day during pandemic that because of the wildfires, the sun really never rose and the sky was orange. And for many folks, that was one of the most real instances where climate change felt personal. It never felt personal in that way before. And that moved a lot of folks to urgency.

Of course, New York because of the wildfires this past summer in Canada experienced the same type of thing. Do you think that it is going to take those personal experiences with climate change for everyone around the world to help us come to this challenge? And do we have time for every one of us to experience a personal relationship with climate change where we can't take our kids out for a walk because the smoke is so bad or we can't go to the local reservoir because the water is too low? Is it going to take that or do you think it looks less bleak than that?

Emily Ma:

I love what you just said, and this is me coming from me as a private citizen, not representing Google's perspective. And this is really important to me. I believe there's a way to align everyone on our path towards a better world and a more sustainable world. How we are motivated is different, and I actually don't care about how we get there. I care about the outcome.

Mike Lepech:

It's a little Machiavellian, but I think here at work.

Emily Ma:

I know, I know I mean, I don't want anyone to do anything crazy that's harming other people along the way. I do care that people don't get severely harmed along the way, and let me make this really, really crisp. So I became very interested in the policymaking side of things, and it was through that lens I realized that actually the left and the right are actually very aligned when it comes to certain climate issues. They might just not use certain words. So I was sitting with a number of representatives and senators, and at one point I realized that as the right cared about democratic access to social services and fair access to water, to air, all these things... Sorry, I mean the left. The right cared about jobs. And especially for those representatives who are representing rural farming communities, their constituents

are like, oh my God, we need water and we need these resources to continue thriving and to continue doing the work that we've been doing for three generations, six generations.

So they care about climate for different reasons, and I think it's less so having a personal experience like the catastrophic air pollution we had in New York and San Francisco. I mean, the floods are happening in Brooklyn right now, goodness gracious. I don't think that's necessary. I do believe that one of the biggest and greatest challenges around climate solutioning right now is understanding how people are motivated and really being able to cut through to what they care about and then connecting the dots. And I don't actually care if we use the word climate or not. I actually don't care. I do care that we have a future where our children or our grandchildren are living a quality of life that is similar or better than the one we have now.

Mike Lepech:

To me, that rings very true. And I suppose one of the things to tie this back to your time at IDEO and to human-centered design, if we think about the first step of design thinking it's empathy. And empathy doesn't mean that you have to experience exactly what someone else experienced. In fact, empathy means you can understand their pain without having to go through it yourself. And I think that when it comes to these types of motivations and needing buy-in, the role of empathy as the first step in design thinking and creating solutions that empathize with other stakeholders issues can be a really powerful set of tools.

Emily Ma:

Spot on. And just recognizing that we all are very unique and we all care about different things, and we have to be able to step in another one's shoes to bring them along. And it's not that we're right or wrong, whether or not we're effective. I actually want to be proven wrong as long as we're effective. So it takes a different level of an awareness of ourselves. I was once told, actually by a number of alumni in their 30th or 40th reunion that the thing that they actually cared most about having been at Stanford and felt them themselves was actually self-awareness. It wasn't a particular... We were joking around navigator stokes equations earlier. I don't know what it is off the top of my head right now, but I can probably look it up. The skill that is actually just as important as those hard skills is those soft skills. The self-awareness, the ability to have the integrity and the empathy for others, and all of that actually matters in working on climate problems.

Mike Lepech:

And that brings us back to entrepreneur and entrepreneur. Those are core skills to any successful founder, whether you're doing a company or we're doing a new project inside your company that's going to try to deliver on some of those promises. The soft skills are so important, whichever camp you sit in. So I want to steer the discussion back to some of your previous experiences. So thinking about other moonshot projects that you've been involved with, does food sustainability differ from them in terms of the approach you need to take as an intrapreneur? As I think about the timeline on impact and the scale of the change that's needed, how do you think about that? Because this is a problem that is global in nature. We're certainly seeing the impact of Ukraine on global food systems and access to nutrition and food. Where do you start with a problem like this and how is it different from other moonshot projects like Loon and Glass?

Emily Ma:

Great question. So I'm going to take a moment to talk about what a moonshot is because I think it's useful. So I'm a huge baseball fan and actually the origin of moonshot, so what I prefer is it was a baseball player by the name of Wally Moon who hit a ball out of the ballpark. And then basically the broadcaster is like, "That's a moonshot," after Wally Moon. A lot of people attribute it to JFK, John F. Kennedy, who challenged the world and really the United States in the sixties to put a man on the moon by the end of the decade. And the notion of a moonshot is to make a commitment to solving something that we don't currently already have a solution for. So earlier we talked about designing a pen. This is a solved problem. We know how to do this. What happens if we have a challenge or a problem that doesn't already have a clear path to the solution?

So at Google, many, many moons ago, there was a part of the company that decided to really focus on some of the challenges that don't have an easy solution. So some of those included, I will take Project Loon as an example. How do you get internet to 60% of the people on earth who are so outside of the urban areas that the telecom companies would never build out to? Because for example, I come from Canada, and there are definitely parts of Northern Canada where it's like one person every 100 square miles. It's like, "Well, why would you ever put a cell phone tower out there?"

Mike Lepech:

Growing up in rural Michigan, I totally got you.

Emily Ma:

Yeah. Okay. So you get it? And yet that individual probably cannot afford satellite phone. So that's an interesting problem. How do you actually truly democratize access to information? And Loon basically tackled that huge problem with a set of breakthrough technologies. So the really cool radical idea was instead of having a cell tower sit on the ground, stick it on a balloon, and then float that balloon around in the stratosphere, and then if you have enough of these balloons, then together it should form a mesh network that basically delivers internet to all the people. And that would be, again, quite radical in terms of how we would operate, be what we call the backhaul into all of the telecom companies in the world. So it would require a different partnership. So that's what a moonshot is.

Ultimately, Loon was not successful because of the stackup of risks involved, but they did get very far. For quite some time, they mitigated. For example, when Hurricane Maria came through, the reason why Puerto Rico was able to be up and running again within 24 hours was because they restored internet access with Project Loon within 24 hours. So people were able to call each other, find access to water safety, all those things pretty quickly. So the difference I think, with food sustainability as a moonshot, looking at whether it's food waste or shifting our diets towards being more plant-based or there's many different food moonshots is it is driven by natural cycles.

And what I mean by that to get really crisp is I was scolded by farmer once a very wise old man on his farm. He said, "Emily, you're very nice person. You are going to go back and you're going to tinker with your code and you're going to recompile it and you're going to recompile it again. And by midnight will have done that 40 times." He's like, "You look at that, I got 200 acres back there. I'm 80 years old. I tinkered once a year. I get one chance a year, and I get 40 chances in my lifetime. So we just work at different speeds." He's like, "I'm not less innovative than you. I just have fewer chances in many ways because I can't make spring, summer, fall, winter move any faster. You can tell me we can simulate these things and all that, but simulation was an imperfect, think of it that way." So there's some limits-

Mike Lepech:

I can see where it comes from. Being trained as a structural engineer, I know that when we build a bridge, version 2.0 is not coming up next year as a relief. So I fully understand this.

Emily Ma:

So I think the speed at which we operate so the iterations can go really fast. And then hardware, I think we can go a little faster so we can build new computers, transistors, we've known the Moore's Law every 18 months. You can cycle that pretty quickly. Structural engineer, you're probably building a bridge to last for, I don't know, 50 years give or take. So you have a KF factor that's quite high. You got to make sure that stuff survives, earthquakes, floods, fires, all that stuff. And then I think the food and ag world is much closer to structural engineering and building for the built environment than it is to software engineering. And that's what makes it different is the iterations that we can do is just fewer.

Mike Lepech:

Does that necessarily mean if you are a intrapreneur or entrepreneur in this space that the two are not related at all? Meaning the model that we use for tech and the model we use for let's say this slower types of innovative cycles, that the funding mechanisms, the way we think about it just has to be completely different? Or are there things that can be leveraged among them?

Emily Ma:

For sure. I think they're not so fundamentally different in the sense that firstly, there are ways to simulate things. So one of my colleagues actually is running an alphabet subsidiary called Mineral, where... I will tell this story because I think it's fascinating. I spent a lot of time in farms and the kitchens and things like that. So if you drive around 80 minutes from where you're sitting, you'll end up on a strawberry farm. I will make a bet that if you just drive randomly south, you'll end up on a strawberry farm.

Mike Lepech:

Watsonville is beautiful.

Emily Ma:

So the way they used to figure out whether a strawberry tasted good is that they would plant 500. So firstly, they would have 10,000 varieties they're looking for. They will probably plant a row of 500 different kinds, and then somebody will go taste it, and then they will manually check things and they will put on a little wooden peg at the end of the row, like a little piece of paper with some pencil marks on it. It takes a long time. So things like being able to speed up inspecting the fruit, inspecting the plants. We can use robotics, we can use computer vision. I mean, at the end of the day, you probably still want a human to taste it, because even with something called bricks testing and a bunch of other things to look for flavor, the human tongue is a very, very fine tuned sensor that we cannot necessarily build for yet.

But I think there's certain things that technology can help speed up so that we can spend our time doing things that are only humans can do versus having to manually do everything. So when I think of food and ag, it's not so far that they're so different that they can't interact. I used to be in a world where it's like technology is everything. And no, especially with the built environment and structural engineering with solving for food and ag challenges, technology is a tool. It's a compliment. It's a way to accelerate. It's a

way to amplify. It's not necessarily the silver bullet that replaces, it's what amplifies what's already working. And in support of the limited human hours, we have day-to-day.

And to your point about the funding mechanisms, you and I have been in the valley for a long time where I think with respect to venture capital, it was possible to build the e-commerce company and turn around IPO in three years and make a huge return. Insane returns. I don't think the same. And I will say, this is where the difference is. I don't think that it's possible to have that situation in food and ag. And even in the built environment, I don't think that there are returns to be made at that scale and at that speed, it requires a different investor.

Mike Lepech:

This brings to mind the current circumstances of Beyond Meat and Beyond Foods and Impossible and the IPO that was very successful, but now trades at a stock price in a multiple that's more similar to craft, actually below, craft with a realization that these are food companies where gross margins are not like Google. So do you think that that will create a challenge for startups in this space, which means maybe this does have to be the purview, particularly with food sustainability, the purview of larger companies where, yes, gross margins are still incredibly important, but from the standpoint of a venture capitalist or investor, they're looking for incredible capital efficiency, high gross margins, and something that will scale very quickly. And does that tend to take these kinds of solutions and push them more towards the entrepreneurship space?

Emily Ma:

Great question. I think it's still possible to be a startup in food and sustainability. I think the motivations are going to be different for founders and for people who are working in this space. I would also say that venture capital is not the only source of capital. There is an enormous amount of funding right now from the federal government, state governments in the space. So the way to do capital formation is just different. There are definitely e-commerce companies. Google was a single round of venture capital. Series A and then boom, that was it. I think it's going to be different, I think for a lot of these companies. And I've been tracking not only Beyond Meat, but number of companies in the vertical farming space, which has had a reckoning. A lot of friends in that space that I really care about.

I still think that vertical farming has a place. It simply requires that much more capital because we are moving atoms and not bits. And it's expensive. The margins are much lower. And I think ultimately it does require going back to you and your structural engineering days, it's more like how we would do project financing in real estate and we can still make a return. It's just a different mindset. It's a different length of time to see the return. It's a different kind of risk taking. It's a different kind of approach that may be a little bit more structured over time.

Mike Lepech:

And what I think that can lead to is a success rate that is not so heavily driven by the power law, which when the vast majority of the enterprises fail, you do have to have these 10 x, 20 x 50 x returns to make the fund. If in fact, the distribution of success is not quite so skewed, you have the capability to have a good return on a group of investments. It becomes much more like make what's portfolio theory and a lot less what we've seen in the venture capital space.

Emily Ma:

Yes, I love what you just said because we're not going for the 100 x out of the thousand companies that we've invested in to make the category level return. We're looking at maybe it's half the portfolio generates you a reasonable multiple. And actually that's actually very common in the food space. I've spent a lot of time working with food companies, and by the way, capitalism was built off the back of food and ag basically. The very first industry is food and ag. I mean, it is also the largest industry on earth, by the way. So it's not like we don't know as human beings how to do this. So we know what we can eat. And I'm actually quite excited about that possibility, about how we reshape. How these organizations are resourced to innovate to a future world where our diets might look very different, the sources of food look different, and the ways we grow food and produce food are different and we all can eat.

Mike Lepech:

One of the things I want to go back to, you had talked about the strawberry example and how we can think about trying to model the taste of strawberries rather than having some specific individual go between the rows and the strawberry patch and determine what's good and what's not. How does that relate to your work at Google on information systems as it relate to food sustainability?

Emily Ma:

Gosh, so many ways. So let me go back to just the foundational thing. So Google is an information company. It's also an innovation company. So at the end of the day, we have to be true to that mission. We are organizing the world's information and making it universally accessible and useful. And the amount of information that we have in the world now is enormous. It's just shocking how much stimulus we get every day just through the information that we receive. And yet it's still inaccessible because there's so much of it. It's totally overwhelming. So when I look at our contribution to the food system space, it's really about what's possible through that platform or those platforms that people use every day. And you'd be surprised. So you're like, "Well, Google's not a food company." Who cares. Sure you have kitchens and sure, Emily, you're in the back of the kitchen being annoying to the chefs.

Mike Lepech:

Wearing your hair.

Emily Ma:

At the end of the day, it's actually our imperative. And the reason for that is if you look at Google search results and you look at who's searching what, a lot of people are on Google looking for information about food. One of the most highly searched terms on YouTube is, what do I do with my leftover chicken? I know people are going to YouTube to be like, "I need a leftover chicken recipe." Yeah. So in response to being a more helpful Google, it is actually our imperative to figure out how to help people do more with the food they have or find food that they need because we see people searching for that kind of information. So it's actually very much in response to a very strong signal we're getting from all over the world.

So I think about food access and food sustainability side by side. And going back to leftover chicken, by the way, one of the most amazing things that we believe we have an opportunity to do, and it's not necessarily me doing the work. It's just I have a lot of friends now across the company who are interested in the space is when you're searching for leftover chicken, can we help you with a whole host

of recipes that give you an understanding of how to basically save time and money? At the end of the day, sustainability is important. Remember I said I care about the outcome. I don't care how you get there. Turns out that sustainability is not necessarily top of mind for everyone, but saving time and money is generally top of mind for everyone. So how we appeal to people really depends on how they come and ask for information or searching.

Mike Lepech:

That's a link between Google's mission around information and what you're doing there.

Emily Ma:

Yeah. So long story short, we've done a ton of experiments in other domains outside of food that we're all learning from. So my favorite example of all time is Google has stepped up in sustainability in very small ways and yet very powerful ways because when you take something small, and you multiply it by a very large number, it still turns out to be very large number. So a lot of people look for flights, for example. So if you're going from San Francisco to New York, there's something like 10,000 ways to get there today. Not that you want to take all of them.

But a couple of years ago there was a team that said, "Actually, the airline industry has figured out what their carbon footprint is. What happens if we just add a little bit of information that's fully vetted by the airline industry, what the footprint looks like?" And then if everything is at parody, price, departure time, everything else you care about is at parody. If you could and you could choose the flight with the slightly lower carbon footprint, how can we make that option just at least visible? So I think about this in the food space a lot. Food is much more complicated because it's not as structured. You could define a flight by just a couple of variables.

Mike Lepech:

Functionally, as we call it, is much more different.

Emily Ma:

Like when you say tomato, I might say tomato. So food is just the most complex thing when it comes to structuring information. So we're still trying to figure that out, and it's probably going to be a work of a lifetime for me.

Mike Lepech:

Sure. So you had also talked about the complex multidisciplinary nature of these problems and how you approach them at Google. Specifically to you, how has your background in engineering and design and business influenced your approach to this, and in particular within the context of climate and sustainability innovation?

Emily Ma:

Yeah. So I think I spoke a little bit about engineering and design earlier about how it turns out that if we are disciplined enough with ourselves to follow a process, things generally turn out to be at least reasonable. So I mentioned the scientific method being one of the greatest inventions of mankind. It's

because it's actually a structured process that takes somebody who might be completely ignorant about a space and then helps us go through and systematically look at a problem. I would say the business side of things. So I did my co-term at Stanford in mechanical engineering, and then I came back from my MBA because I realized that with great science and engineering, to see it scale through the world that well, we live in a world driven by capitalism. We are a society that is capitalistic in nature. And I didn't know a lot about business.

So with respect to the business side of things, I think my greatest regret at Stanford is as an undergrad, I didn't take as many classes in history and psychology in languages and in political science. And the business side is really about that. It's a lot of the, how do I find ways to reach across the aisle and build a relationship with an organization or an individual in another organization who has a part of the puzzle that I can't do for whatever reason, or how do I make this investment work for us collectively? Because at the end of the day, it doesn't make sense for Google to go in and capitalize everything, but it's much stronger if we can go in and say, "By the way, we will take a part in this fund and we will de-risk it for everyone else, and then can we raise a hundred X as a result of that to basically fund this space to move forward?"

So I've had to go and learn a lot of these things and to pull together all the other pieces to solving a climate challenge. We have to take what comes out of design and engineering and science, and then figure out how to work it into the capital systems that we have that are very good at scaling things. So I think the two side by side have helped me get a lot further than I would've ever gotten. And I'm just really grateful for the chances I've had to dabble in both spaces. And depending on the chapter, my career, I might be deeper in one or the other.

Mike Lepech:

Well, that actually leads me to another question. You do teach entrepreneurship here at Stanford, and so you've met the young people who aspire to be entrepreneurs. You said you had wished you'd taken more classes that were maybe outside of the school of engineering. What advice do you give young people here at Stanford who are passionate about sustainability and startups and climate and all of these things, but what advice do you give them?

Emily Ma:

Gosh. Well, I'll keep this to maybe two things. So I'm about to go to my 20th reunion at Stanford. I'm that old. Yes.

Mike Lepech:

You started when you were 12. I didn't know that.

Emily Ma:

I wish. It's so funny. Actually, Turman Engineering was a really sustainable building, and it was actually a really great example of a wood structure, except then termites ate the whole thing. So Turman Engineering no longer exists, but I spent a long time, a lot of my time on the fifth floor because I loved it. It was like my posse. And there was a mechatronics lab up on the fifth floor. We used to do things like throw things from the fifth floor in a dumpster on the first floor. Yeah, I was a bad kid. So I really wish I had stepped out of the building a little bit more to the point about taking a class in history and taking a class and psychology. And almost all of my friends were engineering's friends because heavy, heavy

course load. All of your, I don't know how many units you have to take to graduate, but Chemi was like 120 units.

And I believe if I could go back and redo it again, I would have found a way to really be courageous and take a class on a topic. I knew nothing about. Poli sci would've probably scared me a lot. It still scares me, but now I think I would've benefited from it and just having friends. So beyond the book, learning beyond the theoretical concepts, it's also making friends who are majors in those areas, because at the end of the day, they will play a role in solving these problems as well.

And maybe I'll end with one thing. If I could say anything to Stanford students today and students in general who are going to college and thinking through how they can make an impact, and this is a hat tip to Astro Teller, grandson of Edward Teller by the way, if you've watched Oppenheimer. He will say, "Fall in love with the problem and not the solution." Because the solution that you come up with 99% of the time will not be the right one. You'll get the timing wrong. Something might not be right about it, or it doesn't get traction for whatever reason. You fall in love with the problem, you will continuously come up with new solutions. It will free you to let go of the solution you have in front of you and allow you to pivot more quickly to something that works. So fall in love with the problem. It doesn't matter what it is. Fall in love with the problem.

Mike Lepech:

All right, Emily. So it's time now for our segment called for to fix the planet. So these are four questions we ask all of our guests about climate and sustainability. Are you ready?

Emily Ma:

Do it.

Mike Lepech:

So first, what's on your bookshelf, your playlist or your feed right now?

Emily Ma:

Hidden Potential, Adam Grant, Professor at Wharton. Read it.

Mike Lepech:

Very cool. Next up, what's keeping you up at night?

Emily Ma:

Doing less. The greatest class I ever taught at Stanford was I had 60 students go and sit still at win hover and do absolutely nothing for three straight hours. They were not allowed to do anything. It's hard to do. I still have to train myself to do it. So how do you do less?

Mike Lepech:

Wow. Third, what's giving you hope?

Emily Ma:

Nature finds a way. Whenever I'm feeling not hopeful, I go outside, I go to a forest, I go to a farm. And you realize that plants find a way to grow.

Mike Lepech:

Very inspirational. And then what's your favorite sustainability hack? What's something listeners could do or add to their day-to-day lives to make a difference?

Emily Ma:

Save all your food scraps. No kidding, you probably wouldn't want to come to my house to eat with me because I will probably feed you something that is out of my food scrap spin. But you probably wouldn't know it either. So here's the tip. Keep all your onion skins, keep all your carrot peels, keep all that stuff, maybe not your banana peels. And then throw it in a soup stock pot at the end of every month, freeze everything in the freezer, and then put it in a soup stock pot at the end of the month. And then make broth. You can eke out a little bit more and it's always so delicious.

Mike Lepech:

Great idea. I'm going to take my prerogative as host to ask a fifth question.

Emily Ma:

You're welcome to.

Mike Lepech:

What do you do with your leftover chicken?

Emily Ma:

Chicken noodle soup. Or you can make a really good chicken salad sandwich.

Mike Lepech:

Great idea. All right. I've been talking with today's guest, Emily Ma of Google. Thank you so much, Emily, for joining us today.

Emily Ma:

Thank you.

Mike Lepech:

I'd like to thank today's guest, Emily Ma of Google. If you enjoyed this show, be sure to subscribe to Move Fast and Fix the Planet wherever you get your podcasts. And help others find it by rating, reviewing and sharing. Learn more about this podcast and related work at stvp.stanford.edu/sustainability. Move Fast and Fix the Planet is hosted by me, Mike Lepech, and produced by STVP, the Stanford Engineering Entrepreneurship Center. This episode is supported by Stanford Entrepreneurship Programs. Our producers are Holly McCall and Anthony Ruth. Editing is by Stanford Video. For more podcasts, interviews, and articles, please visit stvp.stanford.edu/ecorner.