

**UNIT 1**                      **The World's Biggest Melting Pot**

**Narrator:**                      Many large modern cities are very multicultural. People come from all over the world to live and work in places like London, Amsterdam, Sydney, Singapore, and São Paulo. But according to the *Guinness book of World Records*, one neighborhood in particular is the most diverse place in the world.

Welcome to Queens, New York.

**New Yorker 1:**                      We're all immigrants. Who understands an immigrant better than an immigrant?

**Narrator:**                      Almost half of the population of Queens was born in another country. Its residents come from 100 different nations, and they speak almost 150 different languages. No racial or ethnic group is a majority here. There may be other neighborhoods with more foreign-born residents, but only here do we find so many different cultures, nationalities, and ethnicities in one place.

**New Yorker 2:**                      I know that, you know, I'm from Madras, the southern part of India. My parents lived there, and my grandparents lived there.

**New Yorker 3:**                      My mom is from South Korea, and on my father's side, I am German, Irish, English, and I think a little bit of Native American, but that part I'm not sure.

**New Yorker 4:**                      My great-grandfather was Puerto Rican and his parents were Puerto Rican and so on and so forth, so as far as I know, we've always been Puerto Rican. And I feel connected to that, and when I look in the mirror, I see that, and I see my grandmother and my great-grandmother. It's something that I cherish, and it's something that I'm very protective of.

You have Eastern Europeans, you have Spanish, you have Turkish, you have Arabic. I like that! I like that very much.

**Narrator:**                      A 2001 study measured diversity using a simple idea: how likely is it that two randomly selected people have different backgrounds? In their study, Queens scored highest in the United States. As the most diverse community in the most diverse country in the world, it's a fair claim. But even if there is no way to prove that it's the most diverse place in the world, Queens is a great example of a melting pot.

## Unit 2

Kang Lee:

### Can You Really Tell if a Kid is Lying?

So, for the last 20 years, I've been studying how children learn to tell lies. And today, I'm going to share with you some of the discoveries we have made. But to begin, I'm going to tell you a story from Mr. Richard Messina, who is my friend and an elementary school principal. He got a phone call one day. The caller says, "Mr. Messina, my son Johnny will not come to school today because he's sick." Mr. Messina asks, "Who am I speaking to, please?" And the caller says, "I am my father."

So, this story ... sums up very nicely three common beliefs we have about children and lying. One, children only come to tell lies after entering elementary school. Two, children are poor liars. We adults can easily detect their lies. And three, if children lie at a very young age, there must be some character flaws with them, and they are going to become pathological liars for life. Well, it turns out all of the three beliefs are wrong.

We found that regardless of gender, country, religion, at two years of age, 30 percent lie, 70 percent tell the truth. At three years of age, 50 percent lie, and 50 percent tell the truth. At four years of age, more than 80 percent lie. And after four years of age, most children lie. So, as you can see, lying is really a typical part of development. And some children begin to tell lies as young as two years of age.

And good lying requires two key ingredients. The first key ingredient is theory of mind, or the mind-reading ability. The second key ingredient for good lying is self-control.

As it turns out, these two abilities are also essential for all of us to function well in our society. In fact, deficits in mind-reading and self-control abilities are associated with serious developmental problems, such as ADHD and autism. So, if you discover your two-year-old is telling his or her first lie, instead of being alarmed, you should celebrate ... because it signals that your child has arrived at a new milestone of typical development.

Now, are children poor liars? Do you think you can easily detect their lies? Would you like to give it a try? Yes? OK. So, I'm going to show you two videos. In the videos, the children are going to respond to a researcher's question, "Did you peek?" So, try to tell me which child is lying, and which child is telling the truth. Here's child number one. Are you ready?

**Adult:** Did you peek?

**Child:** No.

**Kang Lee:** And this is child number two.

**Adult:** Did you peek?

**Child:** No.

**Kang Lee:** OK, if you think child number one is lying, please raise your hand. And if you think child number two is lying, please raise your hand. OK, so as a matter of fact, child number one is telling the truth, child number two is lying. Looks like many of you are terrible detectors of children's lies.

Now, we have played similar kinds of games with many, many adults from all walks of life. And we show them many videos. In half of the videos, the children lied. In the other half of the videos, the children told the truth. And let's find out how these adults performed. Because there are as many liars as truth tellers, if you guess randomly, there's a 50 percent chance you're going to get it right. So, if your accuracy is around 50 percent, it means you are terrible detectors of children's lies.

So, let's start with undergrads and law school students, who typically have limited experience with children. No, they cannot detect children's lies. Their performance is around chance. Now how about social workers and child-protection lawyers, who work with children on a daily basis? Can they detect children's lies? No, they cannot. What about judges, customs officers, and police officers, who deal with liars on a daily basis? Can they detect children's lies? No, they cannot. What about parents? Can parents detect other children's lies? No, they cannot. What about, can parents detect their own children's lies? No, they cannot.

So, now you may ask why children's lies are so difficult to detect. Let me illustrate this with my own son, Nathan. This is his facial expression when he lies. So, when children lie, their facial expression is typically neutral. However, behind this neutral expression, the child is actually experiencing a lot of emotions, such as fear, guilt, shame, and maybe a little bit of liar's delight. Unfortunately, such emotions are either fleeting or hidden. Therefore, it's mostly invisible to us.

So, in the last five years, we have been trying to figure out a way to reveal these hidden emotions. Then we made a discovery. We know that underneath our facial skin, there's a rich network of blood vessels. When we experience different emotions, our facial blood flow changes subtly.

By looking at transdermal video images, now we can easily see facial blood flow changes associated with the various hidden emotions. And using this technology, we can now reveal the hidden emotions associated with lying, and therefore detect people's lies. We can do so noninvasively, remotely, inexpensively, with an accuracy at about 85 percent, which is far better than chance level.

Of course, lying is not the only situation that will evoke our hidden emotions. So, then we asked ourselves, in addition to detecting lies, how can our technology be used? One application is in education. For example, using this technology, we can help this mathematics teacher to identify the student in his classroom who may experience high anxiety about the topic he's teaching so that he can help him. And also, we can use this in health care. For example, every day I Skype my parents, who live thousands of miles away. And using this technology, I can not only find out what's going on in their lives but also simultaneously monitor their heart rate, their stress level, their mood, and whether or not they are experiencing pain. And perhaps in the future, their risks for heart attack or hypertension.

So transdermal optical imaging technology is at a very early stage of development. Many new applications will come about that we don't know today. However, one thing I know for sure is that lying will never be the same again.

Thank you very much. *Xiè xie.*

### Unit 3

Paul Nicklen:

#### Tale of Ice-Bound Wonderlands

My journey to become a polar specialist, photographing, specializing in the Polar Regions, began when I was four-years old, when my family moved from southern Canada to northern Baffin Island, up by Greenland. There we lived with the Inuit in a tiny Inuit community of 200 Inuit people. We were one of three non-Inuit families. And in this community, we didn't have television, we didn't have computers, obviously, radio; we didn't even have a telephone. All of my time was spent outside, with the Inuit, playing. The snow and the ice were my sandbox and the Inuit were my teachers. And that's where I became truly obsessed with this polar

realm, and I knew someday that I was going to do something that had to do with trying to share news and protect it.

We're inundated with news all the time that the sea ice is disappearing and it's at its lowest level, but, in fact, scientists were originally saying sea ice is going to disappear in the next hundred years, then they said the next fifty years. Now they're saying the sea ice in the Arctic, the summer time extent, is going to be gone in the next four to ten years. And what does that mean? After a while of reading this in the news, it just becomes news; you sort of glaze over with it. So, what I'm trying to do with my work is put faces to this. And I want people to understand and get the concept that if we lose ice, we stand to lose an entire ecosystem. Projections are that we could lose polar bears, they could become extinct, in the next fifty to one hundred years.

When I'm on my death bed, I'm going to remember one story more than any other. I don't think I'll ever have another experience like I did with these leopard seals. Leopard seals, since the time of Shackleton, have had a bad reputation.

That's where I got a story idea. I want to go to Antarctica, get in the water with as many leopard seals as I possibly can, and give them a fair shake, see if they actually are these vicious animals or if they're misunderstood.

So, this is that story. Oh, and they also happen to eat Happy Feet. As a species, as humans, we like to say, "Oh penguins are really cute. Therefore, leopard seals eat them; and so leopard seals are ugly and bad." It doesn't work that way. The penguin doesn't know it's cute and leopard seal doesn't know it's big and monstrous; this is just the food chain unfolding.

They're also big! They're not like these little harbor seals; they are twelve feet long, a thousand pounds, and they're also curiously aggressive.

So, after five days of crossing the Drake Passage, we— isn't that beautiful—we had finally arrived at Antarctica. I'm with my Swedish assistant and guide. His name is Godan Elma, from Sweden, Goran, and he's had a lot of experience with leopard seals. I had never seen one. So, we come around the cove in our little zodiac boat and there's this monstrous leopard seal, and even in his voice he goes, "That's a bloody big seal, ya?" And this seal is taking a penguin by the head and it's flipping it back and forth. What it's trying to do is turn that penguin inside out so it can eat the meat off the bones and then it goes off and gets

another one. And so, this leopard seal grabs another penguin, came under the boat and started hitting the hull of the boat. We're trying to not fall in the water, so we sit down and that's when Godan said to me, "This is a good seal, ya. It's time for you to get in the water." And I looked at Godan and said to him, "Forget that."

But he was right. He scolded me out and said, "This is why we're here. You proposed this stupid story to National Geographic and now you've got to deliver. And you can't publish excuses." I had such dry-mouth, probably not as bad as right now, but I had such dry-mouth and my legs were just trembling, I couldn't feel my legs. I put my flippers on, I could barely part my lips; I put my snorkel in my mouth and I rolled over the side of the zodiac and into the water. And this was the first thing she did. She came racing up to me and engulfed my whole camera, and her teeth are up here and down here, but Godan, before I had gotten in the water, had given me amazing advice. He said, "If you get scared, you close your eyes, ya, and she'll go away." So that's all I had to work with at that point, but I just started to shoot these pictures. So, she did this threat display for a few minutes, and then the most amazing thing happened. She totally relaxed. She went off, she got a penguin, she stopped about ten feet away from me, and she sat there with this penguin. The penguin is flapping, and she lets it go. The penguin swims towards me, takes off, and she grabs another one. She does this over and over, and then it dawned on me that she's trying to feed me a penguin. Why else would she release these penguins at me?

And after she did this about four or five times, she swam by me with this dejected look on her face. You don't want to be too anthropomorphic, but I swore that she looked at me like "This useless predator is going to starve in my ocean." So, realizing I couldn't catch swimming penguins, she would get these other penguins and bring them slowly towards me, bobbing like this, and she would let them go. This didn't work. I was laughing so hard, and I was so emotional, that my mask was flooding because I was crying underwater just because it was so amazing. So that didn't work, so then she'd get another penguin and try this ballet-like display, sliding down this iceberg like this and she would sort of bring them over to me and offer them to me. This went on for four days, this didn't just happen a couple of times. And then she realized I just couldn't catch live ones, so she brought me dead penguins. Now I've got four or five penguins floating around my head, and I'm just sitting there shooting away.

And she would often stop and have this dejected look on her face, like “Are you for real?” because she can’t believe that I can’t eat this penguin. And then that wasn’t enough, so she started to flip penguins onto my head, she was trying to force feed me, she was pushing me around, she’s trying to force feed my camera, which is every photographer’s dream. And she would get frustrated. She would blow bubbles in my face, to let me know I was going to starve, but yet she didn’t stop, she would not stop trying to feed me penguins. And on the last day with this female, when I thought I had pushed her too far, I got nervous because she came up to me, she rolled over on her back and she did this deep, guttural, jackhammer sound, this ... and I thought, “She’s about to bite, she’s about to let me know she’s too frustrated with me.” What had happened was that another seal had snuck in behind me and she did that threat display, she chased that big seal away, went and got his penguin, and brought it to me.

That wasn’t the only seal I got in the water with. I got in the water with thirty other leopard seals, and I never once had a scary encounter. They’re the most remarkable animals I’ve ever worked with, and same with polar bears. And just like the polar bears, these animals depend on an icy environment. And ... I get emotional, sorry. It’s a story that lives deep in my heart and I’m proud to share this with you and I’m so passionate about it. Anyone want to come with me to Antarctica or the Arctic? I’ll take you, let’s go. We’ve got to get this story out. Thank you very much!

#### **UNIT 4**

##### **Mark Bezos:**

#### **A Life Lesson from a Volunteer Firefighter**

Back in New York, I am the head of development for a non-profit called Robin Hood. When I'm not fighting poverty, I'm fighting fires as the assistant captain of a volunteer fire company. Now in our town, where the volunteers supplement a highly skilled career staff, you have to get to the fire scene pretty early to get in on any action.

I remember my first fire. I was the second volunteer on the scene, so there was a pretty good chance I was going to get in. But still it was a real footrace against the other volunteers to get to the captain in charge to find out what our assignments would be. When I found the captain, he was having a very engaging conversation with the homeowner, who was surely having one of the worst days of her life. Here it was, the middle of the night, she was standing outside in the pouring rain, under an umbrella, in her pajamas, barefoot, while her house was in flames.

The other volunteer who had arrived just before me—let's call him Lex Luthor—got to the captain first and was asked to go inside and save the homeowner's dog.

The dog! I was stunned with jealousy. Here was some lawyer or money manager who, for the rest of his life, gets to tell people that he went into a burning building to save a living creature, just because he beat me by five seconds. Well, I was next. The captain waved me over. He said, “Bezos, I need you to go into the house. I need you to go upstairs, past the fire, and I need you to get this woman a pair of shoes.” I swear.

So, not exactly what I was hoping for, but off I went – up the stairs, down the hall, past the “real” firefighters, who were pretty much done putting out the fire at this point, into the master bedroom to get a pair of shoes.

Now I know what you're thinking, but I'm no hero. I carried my payload back downstairs where I met my nemesis and the precious dog by the front door. We took our treasures outside to the homeowner, where, not surprisingly, his received much more attention than did mine. A few weeks later, the department received a letter from the homeowner thanking us for the valiant effort displayed in saving her home. The act of kindness she noted above all others: Someone had even gotten her a pair of shoes.

You know, in both my vocation at Robin Hood and my avocation as a volunteer firefighter, I am witness to acts of generosity and kindness on a monumental scale, but I'm also witness to acts of grace and courage on an individual basis. And you know what I've learned? They all matter.

So, as I look around this room at people who either have achieved, or are on their way to achieving, remarkable levels of success, I would offer this reminder: don't wait. Don't wait until you make your first million to make a difference in somebody's life. If you have something to give, give it now. Serve food at a soup kitchen. Clean up a neighborhood park. Be a mentor. Not every day is going to offer us a chance to save somebody's life, but every day offers us an opportunity to affect one. So, get in the game. Save the shoes.

Thank you.



**Ric Elias:** Imagine a big explosion as you climb through 3,000 feet. Imagine a plane full of smoke. Imagine an engine going clack, clack, clack ... It sounds scary.

Well, I had a unique seat that day. I was sitting in 1D. I was the only one who could talk to the flight attendants. So, I looked at them right away, and they said, "No problem. We probably hit some birds." The pilot had already turned the plane around, and we weren't that far. You could see Manhattan. Two minutes later, three things happened at the same time.

The pilot lines up the plane with the Hudson River. That's usually not the route. He turns off the engines. Now, imagine being in a plane with no sound. And then he says three words. The most unemotional three words I've ever heard. He says, "Brace for impact." I didn't have to talk to the flight attendant anymore. I could see in her eyes, it was terror. Life was over.

Now I want to share with you three things I learned about myself that day. I learned that it all changes in an instant. We have this bucket list, we have these things we want to do in life, and I thought about all the people I wanted to reach out to that I didn't, all the fences I wanted to mend, all the experiences I wanted to have and I never did. As I thought about that later on, I came up with a saying, which is, I no longer want to postpone anything in life. And that urgency, that purpose, has really changed my life.

The second thing I learned that day—and this is as we clear the George Washington Bridge, which was by not a lot—I thought about, wow, I really feel one real regret. I've lived a good life. In my own humanity and mistakes, I've tried to get better at everything I tried. But in my humanity, I also allow my ego to get in. And I regretted the time I wasted on things that did not matter with people that matter. And I thought about my relationship with my wife, with my friends, with people. And after, as I reflected on that, I decided to eliminate negative energy from my life. It's not perfect, but it's a lot better. I've not had a fight with my wife in two years. It feels great. I no longer try to be right; I choose to be happy.

The third thing I learned—and this is as your mental clock starts going, "15, 14, 13." You can see the water coming. I'm saying, "Please blow up." I don't want this thing to break in 20 pieces like you've seen in those documentaries. And as we're coming down, I had a sense of, wow, dying is not scary. It's almost like we've been preparing for it our whole lives. But it was very sad. I didn't want to go; I love my life. And that sadness

really framed in one thought, which is, I only wish for one thing. I only wish I could see my kids grow up.

About a month later, I was at a performance by my daughter—first-grader, not much artistic talent ... Yet! And I'm bawling, I'm crying, like a little kid. And it made all the sense in the world to me. I realized at that point, by connecting those two dots, that the only thing that matters in my life is being a great dad. Above all, above all, the only goal I have in life is to be a good dad.

I was given the gift of a miracle, of not dying that day. I was given another gift, which was to be able to see into the future and come back and live differently. I challenge you guys that are flying today, imagine the same thing happens on your plane—and please don't—but imagine, and how would you change? What would you get done that you're waiting to get done because you think you'll be here forever? How would you change your relationships and the negative energy in them? And more than anything, are you being the best parent you can?

Thank you.

## UNIT 6

### Joseph Michael:

#### Antarctica: While You Were Sleeping

I guess my life reflection of a lot of people's lives is we live in these heavily urbanized places, covered in concrete, cars, technology all around us, but we aspire to go to those, back to those natural places, and it's something that I'm constantly searching for. You see, I live in the city and then I come out to places like this and look for nature, or just look for that solitude, so there's just a combination of the things I enjoy.

So, my name's Joseph Michael and I'm a media artist. What I do is combine a mixture of, say, photography, video, moving image; tends to be digital artwork. My passions in life, I'm passionate about exploration, adventure, first and foremost, but I really love photography; the most simple, simplistic form of art. When I'm taking photographs, it's just me and the camera, and I'm always learning, every day.

Art is about doing complex things for a simple reason. So, in terms of what I've created on the museum, it's a very simple idea: It's an iceberg, and it's in the city. You think that it's simple, but it's such a complex process. I enjoy the technical challenges. I enjoy things that push me further in terms of what I'm learning and what I'm discovering.

We chartered a boat and sailed across the Drake Passage, and we spent a month around the Antarctic Peninsula. And the idea was to photographically map icebergs. The scale and awe of the place; it has an aura, it has, I don't know, it feels otherworldly, and it's kind of unnerving.

So, in terms of environmental message, I try not to be too forceful with what I'm creating. I like to present an idea and not give too many answers to my interpretation of what's going on. So, in terms of the iceberg, it's just placing it in an urban environment so people can see the size and scale of an iceberg and then, you know, people will go off and ask their own questions.

It's hard to get someone engaged with, obviously, sustainability or looking after our environment based on practical science, you know, and ideas. Connecting people with a feeling of grandeur or the awe of nature, in my mind, you know, connects them at a deeper level. But if you're not connecting with the heart, you're not really engaged in the topic.

The whole project from the start to the end of the installation in Auckland took four years. It took us two years to mount the expedition to Antarctica: fund it, crew it, get down there, film the content. And then the next two years we spent creating the installation.

It was pretty exciting to start to see the digital work come into a physical space. You're sort of in a physical world in Antarctica, now in a digital, virtual world for months and months and months, editing, looking at a screen, but then to see, give it a physical presence in the real world was pretty exciting.

With our projections, we did, like, test projections on scale models because otherwise you don't have a chance before you put it on the building. You need to sort of get closer to knowing that it's going to work because you take photographs. We did like a three-billion-point scan of the building, which gave us a building scan, and you're sort of never really entirely certain that it's going to match up perfectly, and so we do a series of scale models to get us close to projecting on that final building.

I guess it's like peeling an orange. You peel the skin of the iceberg when you photograph it, it's like an orange peel. We pull it off and then we wrap that back on to the building. The process isn't that simple: It goes through several layers to get to that process, but essentially, it's like putting it back on.

The biggest thing I've learned over the last few years is how important sound is for the emotional connection. Especially with the art, it's really important that people feel something. So, you can put whatever visuals you like, adding that sound element and paying close attention to the sound really makes a difference.

I think the composition was designed to transport people to how I felt in Antarctica. And I had no idea that each iceberg would be completely unique in a sound signature. I took a sound recorder knowing that there would be potential to capture things, but I had no idea the diverse nature of the sound down there.

This is the biggest thing about being an artist or a creative is you got to have that lack of fear of failure because in art, you don't succeed all the time. And as a creative, not every project's going to be successful. You just have to start and see where it leads.

## **UNIT 7**

### **SpaceX's Plan to Fly You Across the Globe in 60 Minutes**

**Chris Anderson:**

So, two months ago, something crazy happened. Can you talk us through this, because this caught so many people's attention?

**Gwynne Shotwell:**

I'll stay quiet for the very beginning, and then I'll start talking.

**Voices:**

Five, four, three, two, one.

**Woman:**

Liftoff. Go Falcon Heavy.

**Gwynne Shotwell:**

So, this was such an important moment for SpaceX. With the Falcon 9 and now the Falcon Heavy, we can launch into orbit any payload that has previously been conceived or is conceived right now. We've got a couple of launches of Falcon Heavy later this year, so this had to go right. It was the first time we flew it, and the star of the show, of course, brother and sister side boosters landing. I was excited.

**Chris Anderson:**

Gwynne, let's wind the clock back. I mean, how did you end up an engineer and president of SpaceX? Were you super-nerdy as a girl?

**Gwynne Shotwell:**

I don't think I was nerdy, but I was definitely doing the things that the girls weren't doing. I asked my mom, who was an artist, when I was in third grade, how a car worked, so she had no idea so she gave me a book, and I read it, and sure enough, my first job out of my mechanical

engineering degree was with Chrysler Motors in the automotive industry. But I actually got into engineering not because of that book but because my mom took me to a Society of Women Engineers event, and I fell in love with the mechanical engineer that spoke. She was doing really critical work, and I loved her suit.

And that's what a 15-year-old girl connects with. And I used to shy away from telling that story, but if that's what caused me to be an engineer - - hey, I think we should talk about that.

**Chris Anderson:** So, despite the remarkable success there of that Falcon Heavy rocket, you're actually not focusing on that as your future development plan. You're doubling down to a much bigger rocket called the BFR, which stands for ...

**Gwynne Shotwell:** It's the Big Falcon Rocket.

**Chris Anderson:** The Big Falcon Rocket, that's right.

**Chris Anderson:** The logic is that BFR is what you need to take humanity to Mars?

**Gwynne Shotwell:** That's correct.

**Chris Anderson:** But somehow, you've also found other business ideas for this.

**Gwynne Shotwell:** Yes. BFR can take the satellites that we're currently taking to orbit to many orbits. It allows for even a new class of satellites to be delivered to orbit. Basically, the width, the diameter of the fairing is eight meters, so you can think about what giant telescopes you can put in that fairing, in that cargo bay, and see really incredible things and discover incredible things in space. But then there are some residual capabilities that we have out of BFR as well.

**Chris Anderson:** Right, and so that allows you -- I mean, I still don't really believe this video that we're about to play here. What on Earth is this?

**Gwynne Shotwell:** So, it currently is on Earth, but this is basically space travel for earthlings. I can't wait for this residual capability. Basically, what we're going to do is we're going to fly BFR like an aircraft and do point-to-point travel on Earth, so you can take off from New York City or Vancouver and fly halfway across the globe. You'll be on the BFR for roughly half an hour or 40 minutes, and the longest part -- yeah, it's so awesome.

The longest part of that flight is actually the boat out and back.

**Chris Anderson:** I mean. Gwynne, come on, this is awesome, but it's crazy, right? This is never going to actually happen.

**Gwynne Shotwell:** Oh no, it's definitely going to happen. This is definitely going to happen.

**Chris Anderson:** So how many passengers can possibly afford the fortune of flying by space?

**Gwynne Shotwell:** So, the first BFR is going to have roughly a hundred passengers. And let's talk a little bit about the business. Everyone thinks rockets are really expensive, and to a large degree they are, and how could we possibly compete with airline tickets here? But if you think about it, if I can do this trip in half an hour to an hour, I can do dozens of these a day, right? And yet, a long-haul aircraft can only make one of those flights a day. So even if my rocket was slightly more expensive and the fuel is a little bit more expensive, I can run 10x at least what they're running in a day, and really make the revenue that I need to out of that system.

**Chris Anderson:** So, you really believe this is going to be deployed at some point in our amazing future. When?

**Gwynne Shotwell:** Within a decade, for sure.

**Chris Anderson:** OK, that's certainly amazing.

**Gwynne Shotwell:** I'm personally invested in this one, because I travel a lot and I do not love to travel, and I would love to get to see my customers in Riyadh, leave in the morning and be back in time to make dinner.

**Chris Anderson:** So, we're going to test this out. So, within 10 years, an economy price ticket, or, like, a couple thousand dollars per person to fly New York to Shanghai.

**Gwynne Shotwell:** Yeah, I think it'll be between economy and business, but you do it in an hour.

**Chris Anderson:** Yeah, well, OK, that is definitely something.

And meanwhile, the other use of BFR is being developed to go a little bit further than Shanghai. Talk about this. You guys have actually developed

quite a detailed, sort of, picture of how humans might fly to Mars, and what that would look like.

**Gwynne Shotwell:** Yeah. So, we've got a video, this is a cropped video from others we've shown, and then there's a couple of new bits to it. But basically, you're going to lift off from a pad, you've got a booster as well as the BFS, the Big Falcon Spaceship. It's going to take off. The booster is going to drop the spaceship off in orbit, low Earth orbit, and then return just like we're returning boosters right now. So, it sounds incredible, but we're working on the pieces, and you can see us achieve these pieces. So, booster comes back. The new thing here is that we're going to actually land on the pad that we launched from. Currently, we land on a separate pad, or we land out on a boat. Fast, quick connect. You take a cargo ship full of fuel, or a fuel depot, put it on that booster, get that in orbit, do a docking maneuver, refuel the spaceship, and head on to your destination, and this one is Mars.

**Chris Anderson:** So, like, a hundred people go to Mars at one time, taking, what, six months? Two months?

**Gwynne Shotwell:** It ends up depending on how big the rocket is. I think this first version, and we'll continue to make even bigger BFRs, I think it's a three-month trip. Right now, the average is six to eight, but we're going to try to do it faster.

**Chris Anderson:** When do you believe SpaceX will land the first human on Mars?

**Gwynne Shotwell:** It's a very similar time frame from the point-to-point. It's the same capability. It will be within this decade. Within a decade -- not this decade.

**Chris Anderson:** In real time, again, within a decade. Well, that would also be amazing.

Why, though? Seriously, why? I mean, you've got a company where this is the official stated mission. Has everyone actually bought into that mission, given that, I mean, there's a lot of people around who think, come on, you've got so much talent, so much technology capability? There are so many things on Earth that need urgent attention. Why would you have this escape trip off to another planet?

**Gwynne Shotwell:** So, I am glad you asked that, but I think we need to expand our minds a little bit. There are plenty of things to do on Earth, but there are lots of companies working on that. I think we're working on one of the most

important things we possibly can, and that's to find another place for humans to live and survive and thrive. If something happened on Earth, you need humans living somewhere else.

It's the fundamental risk reduction for the human species. And this does not subvert making our planet here better and doing a better job taking care of it, but I think you need multiple paths to survival, and this is one of them. And let's not talk about the downer piece, like, you go to Mars to make sure all earthlings don't die. That's terrible, actually, that's a terrible reason to go do it. Fundamentally, it's another place to explore, and that's what makes humans different from animals, it's our sense of exploration and sense of wonderment and learning something new. And then I also have to say, this is the first step in us moving to other solar systems and potentially other galaxies.

**Chris Anderson:** That is a big vision.

Gwynne Shotwell, thank you. You have one of the most amazing jobs on the planet.

**Gwynne Shotwell:** Thank you very much. Thanks, Chris.

## **UNIT 8**

**Minda Dentler:**

### **What I Learned When I Conquered the World's Toughest Triathlon**

It was October 13, 2012, a day that I will never forget. I was on my bike, pushing up what seemed like a never-ending barren hill. And it wasn't just any hill: it was a 15-mile climb up to a town called Hawi on the Big Island of Hawaii. And it wasn't just any ride: it was at the Ironman World Championship. I can still feel my muscles burning. I was struggling, tired and dehydrated, as I could feel the heat emanating from the asphalt, measuring almost 98 degrees. I was near the halfway point of the bike portion of one of the most prestigious, longest, single-day endurance race events in the world.

At age 28, I was introduced to the sport of hand-cycling, and then triathlon, and by luck, I met Jason Fowler, an Ironman World Champion, at a camp for athletes with disabilities. And like me, he competed in a wheelchair. And with his encouragement, at age 34, I decided to go after Kona. The Kona, or Hawaii Ironman is the oldest Iron-distance race in the sport, and if you're not familiar, it's like the Super Bowl of triathlon. And the Ironman, for a wheelchair athlete like me, consists of a 2.4-mile open-water swim in the Pacific Ocean, a 112-mile hand cycle ride in lava fields - now, that sounds exotic, but it's not as scenic as it sounds, and it's



pretty desolate -- and then you top it off with a marathon, or a 26.2-mile run in 90-degree heat using a racing wheelchair. That's right, it's a total distance of 140.6 miles using just your arms in less than 17 hours. No female wheelchair athlete had ever completed the race because of the strict, seemingly impossible cutoff times. And so there I was, putting it all out on the line. And when I finally reached the top of that 15-mile climb, I was discouraged. There was no way I was going to make that swim/bike time limit of 10 and a half hours, because I was almost two hours off pace. I had to make the agonizing decision to quit. I removed my timing chip, and I handed it over to a race official. My day was done.

My best friend Shannon and my husband Shawn were waiting at the top of Hawi to drive me back to town. And on my way back to town, I began to cry. I had failed. My dream of completing the Ironman World Championship was crushed. I was embarrassed. I felt like I'd messed up. I worried about what my friends, my family and people at work would think of me. What was I going to put on Facebook? How was I going to explain to everyone that things didn't go the way I had assumed or planned?

A few weeks later I was talking to Shannon about the Kona "disaster," and she said this to me: "Minda, big dreams and goals can only be realized when you're ready to fail." I knew I had to put that failure behind me in order to move forward, and it wouldn't be the first time that I had faced insurmountable odds.

I was born in Bombay, India, and just before my first birthday, I contracted polio, which left me paralyzed from the hips down. Unable to care for me, my birth mother left me at an orphanage. Fortunately, I was adopted by an American family, and I moved to Spokane, Washington just shortly after my third birthday. Over the next few years, I underwent a series of surgeries on my hips, my legs, and my back that allowed me to walk with leg braces and crutches.

As a child, I struggled with my disability. I felt like I didn't fit in. People stared at me all the time, and I was embarrassed about wearing a back brace and leg braces, and I always hid my chicken legs under my pants. As a young girl, I thought thick, heavy braces on my legs did not look pretty or feminine. Among my generation, I am one of the very few individuals in the US who are living with paralysis by polio today. Many people who contract polio in developing countries do not have access to the same medical care, education, or opportunities like I have had in America. Many do not even live to reach adulthood. I have the humbling

knowledge that, had I not been adopted, I most certainly wouldn't be in front of you today. I may not even be alive.

All of us, in our own lives, may face seemingly insurmountable goals. I want to share with you what I learned when I tried again.

One year after my first attempt, on a sunny Saturday morning, my husband Shawn dumped me into the ocean at the Kona Pier and, with 2,500 of my closest friends and competitors, we started swimming as that cannon went off promptly at 7am. I focused on one stroke at a time, staying in between bodies, counting my strokes -- one, two, three, four -- and lifting my head to sight every so often just so I wouldn't get too off track. And when I finally reached the shoreline, Shawn picked me up, and he carried me out of the water. I was so stunned and thrilled when Shawn had told me I had managed a one-hour-and-43-minute swim time.

On to the bike segment. I had eight hours and 45 minutes to complete the 112-mile bike course. I broke up the course in seven- to 10-mile segments in my mind just to reduce the enormity of the race. The first 40 miles, they clipped by as we benefited from a little tail wind. By 4pm, I had made it to mile 94, and I did the math and I realized I was in serious time jeopardy because I had 18 miles to go and less than 90 minutes, and that included a few sizable hill climbs. I was stressed out, and I was scared that I wasn't going to make that time cutoff again.

At this point, I pushed my internal voice aside that said, "This hurts. Quit." And I told myself, "Minda, you better focus. Focus on what you can control, and that is your attitude and your effort." I resolved to be OK being uncomfortable, and I told myself, "Push harder, forget about the pain, and keep that laser focus." For the next 90 minutes, I cranked as though my life depended on it. And when I rolled into town, I heard on the loudspeaker, "Minda Dentler is one of the last competitors to make the bike cutoff." I did it!

By only three minutes.

It was 5:27 p.m., and I had been racing for 10-and-a-half hours. The first 10 miles of the run went pretty quickly, as I was so excited to finally pass people with my three wheels to their two feet. The sun quickly went down, and I found myself pulling up to the bottom of Palani hill, looking straight into a half-mile hill that looked like Mt. Everest at mile 124 of the race. My friends and family were ready at their stations to talk me up that hill. I was struggling, tired, desperately gripping those rims just so I

wouldn't tip backwards. When I finally reached the top of that hill, I turned left onto a very lonely 15-mile stretch onto the Queen K Highway, totally exhausted. I pressed on, focusing on one push at a time. By 9:30 p.m., I made that final right-hand turn onto Ali'i Drive. I heard the crowd's roar, and I was overcome with emotion.

I crossed that finish line.

And my final time was 14 hours and 39 minutes. For the first time in the 35-year history, a female wheelchair athlete completed the Ironman World Championship.

And it wasn't just any female athlete. It was me.

A paralyzed orphan from India. Against all odds, I achieved my dream, and through this very personal commitment to myself, I slowly realized that completing the Ironman was about more than conquering Kona. It was about conquering polio and other disabling but preventable diseases, not only for myself, but for the millions of children who have been and still will be afflicted by vaccine-preventable diseases. Today, we are closer than ever to eliminating one of those diseases everywhere in the world.

In the mid-1980s, polio once paralyzed more than 350,000 children a year in more than 125 countries. That amounted to a staggering 40 cases an hour. By contrast, so far this year, the last endemic countries have reported a total of only 12 cases. Since 1988, more than 2.5 billion children have been immunized against polio, and an estimated 16 million children, who otherwise would have been paralyzed like me, are walking. Despite this incredible progress, we know that until it is eradicated, polio remains a very real threat, especially to children in the poorest communities of the world. It can reemerge in some of the most remote and dangerous places, and from there, it can spread.

And so, this is my new Ironman: to end polio. And I am reminded every day, when I look at my two-and-a-half-year-old daughter Maya. She is able to climb a ladder in the park, push her scooter or kick a ball across the grass. Almost everything that I see her do at her age reminds me of what I could not do at that age. And when she was two months old, I took her to get her first polio vaccine. And when the doctor came in the room to prepare the shot, I asked him if I could take a picture to document the moment. When we left the room, I could feel my eyes welling up with tears. I cried the entire way home. It was in that moment that I realized that my daughter's life would be very different from mine. She will never

be faced with the crippling disability of polio, because a vaccine was available, and I chose to get her immunized. She can do anything she wants, as can each of you.

Now I'd like to leave you all with one question: what is your Ironman?

## **UNIT 9**

### **An Everyday Danger**

**Anastasia:**

It is not a terminal illness that my child has, but it is an every day, every second, every moment risk.

The unknown of every day: he could possibly die, and we have no clue when it's going to happen sometimes.

**Xaviar:**

But it uses energy and then puts them in the water.

**Anastasia:**

But if we're prepared, we're continuing on his life.

**Xaviar:**

Yes! Yes! Yes! Yes!

**Anastasia:**

Xaviar is allergic to peanuts, seafood, all tree nuts, shellfish, kiwis, cucumbers, sesame, peas, chickpeas, lentils, lima beans. He used to be allergic to eggs, which he outgrew. Is there anything else that I'm missing? And coconut. It's ever-changing, and that's the guessing game that I don't like.

Some people don't believe that food allergies are real at all. A lot of people think that they should be able to give their kids whatever foods they want and send them off to school with as much peanut butter, as much tree nuts ... What they don't understand is they're putting a child's life at risk.

He could be on a playground and somebody could have a peanut butter and jelly sandwich. He'd go on the same monkey bars and then he could go ahead and like pick his nose or wipe his lip, and he could have a reaction.

This is why his being in school is so crazy, too, because they're using the same keyboards, they're opening the same books. It's the unknown that's really scary.

**Xaviar:**

Where is my book bag?

**Dr. Wood:** There are a lot of theories on why allergy's been increasing. And probably many of them have contributed. But the most popular one that's out there is called the hygiene theory. And the hygiene theory says that we live in too clean an environment, and that if you're not exposed to enough in the way of germs or bacteria or infections early in life, your immune system will not be kept busy and will focus on things like allergy.

**Anastasia:** So, there's all these theories of why, and that's what I used to focus on: Why is this happening? I also felt like, what did I do during my pregnancy that increased his chances of having food allergies, so there's a lot of Mom guilt, too. But now I'm just like, ah, we just have to deal with it because there's no solving it just yet.

**Dr. Wood:** You have to plan for your food allergy every day: every meal, every snack, about what the ingredients of that food are. The second big piece of it that runs your life is you have to be ready for that accidental exposure, that accidental reaction. And one of the real scary things [is] you never know what the next reaction will look like.

**Anastasia:** He ate half a cashew and immediately, within five minutes, my son was turning blue. He has to know how to stand up for himself, keep himself safe. So, it's a combination of physical and emotional stuff we go through on a regular basis, so he is prepared.

**Xaviar:** ... allergy to all nuts, seafood, sesame ... And then just put it back in the case, call 911.

**Anastasia:** All of those things that any young beautiful child, adolescent, teenager, adult wants to do. When he has his first kiss, wanting to travel the world, go to college and become an independent person ... all of those things for him are going to come with some sense of responsibility for food allergies. But if we raise a child who is confident and happy with himself, hopefully he'll be just fine coping.

## **UNIT 10 From Ancient to Modern**

**Narrator:** Many ancient cultures have shaped our modern world.

From the Egyptians, we get our 24-hour day and 365-day year. They also developed new ways to measure distances and lengths and new inventions for taking water from rivers to farm fields. And although modern paper is very different from the paper the Egyptians used, the

English word “paper” comes from the name of the papyrus plant that grows along the Nile River.

We get many things from the ancient Greeks, too. The first democracy that we know about happened in the Greek city-state of Athens. Greek art and architecture are famous, too. Greek art influenced Renaissance artists like Michelangelo and Leonardo da Vinci. And the Greeks developed three types of columns and used them in buildings like the Parthenon. These columns have been imitated by other societies around the world for thousands of years. And of course, many people still study Greek literature, such as the poems of Homer and the plays of Sophocles.

Roman society had a huge impact on the world, too, especially western societies. At least one billion people, for example, speak languages like Spanish, Portuguese, and Italian that developed from Latin. Even English is heavily influenced by Latin. Some experts say that almost 30 percent of English words are originally from the language that the Romans spoke. And Rome has also had an influence on modern art, politics, literature, and even food.

But there is one civilization that was in power thousands of years before the Egyptians, the Greeks, and the Romans. This society is less well-known but it has had a huge impact on modern society.

The story of writing, astronomy, and law. The story of civilization itself begins in one place. Not Egypt, not Greece, not Rome, but Mesopotamia.

Mesopotamia was located between two important rivers: the Tigris and the Euphrates. For over five thousand years, several civilizations lived in this small area in what is today Iraq, Kuwait, and Syria. They developed innovations that would change the world forever.

Mesopotamia had many advantages. It had a good climate, excellent soil, and plenty of fresh water. As a result, farming was easy for the people who lived there.

At first, people there lived in small settlements. Then, about 6,000 years ago, some of these places grew larger and became some of the world’s first cities. Between 6,000 and 5,000 years ago, these city-states competed with each other. At one point, the Akkadian Empire controlled them all. This empire then broke apart into the empires of Assyria and Babylon.

Wars and fighting were common during this period. However, the Mesopotamians also built huge palaces, temples, and other buildings. The ruins of some of them can still be seen.

They also developed advanced mathematics, including a base 60 system that created a 60-second minute, a 60-minute hour, and a 360-degree circular angle.

They used their system of mathematics to study the stars and planets. They divided the year into twelve periods. Each period was named for a group of stars in the night sky. The Greeks later did the same thing to create the signs of the Zodiac that we still know and use today. The Mesopotamians also divided the week into seven days named after their gods.

But perhaps the most important innovation to come out of Mesopotamia is writing. At first, people just drew pictures on tablets of wet clay to keep track of their goods. But over time, they developed an advanced writing system.

In modern times, we use the name *cuneiform* to describe Mesopotamian writing. The system was so flexible that it was used for about 3,000 years and adapted for at least twelve languages. People used this writing system in many ways. One of the most important was writing down the laws and justice system of King Hammurabi.

Empires like Babylon were so successful that other societies wanted to attack them, and Mesopotamian culture ended at last.

Around 2,500 years ago, Cyrus, the king of Persia, conquered Babylon and took control of Mesopotamia. For centuries, the area was controlled by foreign leaders. But all things end, and over time, the cities of Mesopotamia sank beneath the sands and the names of its leaders were lost to history. But in our modern world, Mesopotamian developments like writing, law, math, and science live on.

## UNIT 11

### Narrator:

## SOLA

Most people would agree that education is a good thing and that everyone should have the right to be educated. In some countries, however, education may not be available to everyone, especially girls.

According to UNESCO—the United Nations Educational, Scientific, and Cultural Organization—about 130 million girls around the world are not in school.

That's about the same number of people as the entire population of Mexico or Japan.

This is bad for those girls who cannot receive an education, of course. It is also bad for their current and future families. Studies show that if a girl has just one extra year of education, she can earn 20 percent more money when she is an adult. As a result, not educating girls can have a negative effect on society, too.

Fortunately, fearless educators are working hard to give girls the same educational opportunities that boys have. Shabana Basij-Rasikh is one of them.

**Shabana:**

My name is Shabana Basij-Rasikh.

I'm the President and co-founder of SOLA, School of Leadership Afghanistan. It's the first girl's boarding school in Afghanistan. Their education has a real purpose, not just for them to have a good job, good income, but their education is also for them to serve their country, to be responsible global citizens.

If we educate a girl, we educate her family, her community, her society, and the world at large. An educated woman especially in developing worlds tend to spend more than 90% of their income back in their family. An educated woman will have fewer and healthier children. She will make sure that her children get educated.

My parents have always made it known to me and to my siblings that education is their number one priority for us. Six percent of women in Afghanistan have a college degree. To be a part of that small minority, I feel extremely lucky and privileged. But at the same time, how did I get to be so lucky? Maybe there was a reason. I realized that I needed to become an educator.

The way we have set up SOLA even within a year of being at SOLA, young girls go back home, they talk about how much English they have learned. They talk about the fact that they have learned how to ride bicycle. They talk about meeting amazing people who have come to the school and talked about their work.



They talk about the photography class they have taken or the filming class they have taken, or they talk about visiting some historic places in Afghanistan and all of this makes her a very different person in her household and that's why it's important.

The process of empowerment has to be initiated from within. We create a safe space for these girls to be able to grow into their confident selves.

**Girl 1:** If I can't be a doctor, I want to be a teacher of science.

**Girl 2:** I want to be an explorer. I want to be so many things, but it's really hard to decide.

**Girl 3:** I want to be doctor and a teacher.

**Girl 4:** I want to prove that girl can do everything.

**Shabana:** They all come here to learn to become the future leaders of Afghanistan. The solution to problems in Afghanistan have to come from Afghans. When you educate a girl, you educate her family, her community, her society and our world at large.

They discuss anything from politics to culture to education, to the differences and similarities between our cultures to conflict resolution and for them to get this opportunity at such a young age, to do this is phenomenal. They come from different linguistic backgrounds, different ethnicities, different experiences and yet at SOLA, they're given a common challenge and that's to speak English at all times.

Why is this so important? For a native English speaker, they may not think about this but English is the language of business. It's the language in which the most up to date discoveries is available. It's the language in which a wealth of information is available. And I want these young girls who come from all over Afghanistan, from some of the most remote parts of the country, to have access to this world directly so that they can then take this world to their home villages and spread it.

My students are very ambitious. They are extremely driven. They are smart. They understand what their education means not just for them but for their families.

They are the solution to some of the most challenging problems facing the world today.

## UNIT 12

### Simone Giertz:

#### Why You Should Make Useless Things

Hello. My name is Simone. You know how people tell you if you get nervous when onstage, picture people in the audience naked? Like it's this thing that's supposed to make you feel better. But I was thinking -- picturing all of you naked in 2018 feels kind of weird and wrong. Like, we're working really hard on moving past stuff like that, so we need a new method of dealing with if you get nervous onstage. And I realized that what I'd really like is that I can look at you as much as you're looking at me -- just to even things out a little bit. So, if I had way more eyeballs, then we'd all be really comfortable, right? So, in preparation for this talk, I made myself a shirt.

It's googly eyes. It took me 14 hours and 227 googly eyes to make this shirt. And being able to look at you as much as you're looking at me is actually only half of the reason I made this. The other half is being able to do this.

So, I do a lot of things like this. I see a problem and I invent some sort of solution to it. For example, brushing your teeth. Like, it's this thing we all have to do, it's kind of boring, and nobody really likes it. If there were any seven-year-olds in the audience, they'd be like, "Yes!" So, what about if you had a machine that could do it for you?

I call it ... I call it "The Toothbrush Helmet."

So, my toothbrush helmet is recommended by zero out of ten dentists, and it definitely did not revolutionize the world of dentistry, but it did completely change my life. Because I finished making this toothbrush helmet three years ago, and after I finished making it, I went into my living room and I put up a camera, and I filmed a seven-second clip of it working. And by now, this is a pretty standard modern-day fairy tale of girl posting on the internet, the internet takes the girl by storm, thousands of men voyage into the comment sections to ask for her hand in marriage.

She ignores all of them, starts a YouTube channel and keeps on building robots. Since then, I've carved out this little niche for myself on the internet as an inventor of useless machines, because as we all know, the easiest way to be at the top of your field is to choose a very small field.

So, I run a YouTube channel about my machines, and I've done things like cutting hair with drones ...

To a machine that helps me wake up in the morning ...

Ow!

To this machine that helps me chop vegetables.

I'm not an engineer. I did not study engineering in school. But I was a super ambitious student growing up. In middle school and high school, I had straight A's, and I graduated at the top of my year. On the flip side of that, I struggled with very severe performance anxiety. Here's an email I sent to my brother around that time. "You won't understand how difficult it is for me to tell you, to confess this. I'm so freaking embarrassed. I don't want people to think that I'm stupid. Now I'm starting to cry too." And no, I did not accidentally burn our parents' house down. The thing I'm writing about in the email and the thing I'm so upset about is that I got a B on a math test.

So, something obviously happened between here and here.

One of those things was puberty. Beautiful time indeed.

But moreover, I got interested in building robots, and I wanted to teach myself about hardware. But building things with hardware, especially if you're teaching yourself, is something that's really difficult to do. It has a high likelihood of failure, and moreover, it has a high likelihood of making you feel stupid. And that was my biggest fear at the time. So, I came up with a setup that would guarantee success 100 percent of the time. With my setup, it would be nearly impossible to fail. And that was that instead of trying to succeed, I was going to try to build things that would fail. And even though I didn't realize it at the time, building stupid things was actually quite smart, because as I kept on learning about hardware, for the first time in my life, I did not have to deal with my performance anxiety. And as soon as I removed all pressure and expectations from myself, that pressure quickly got replaced by enthusiasm, and it allowed me to just play.

So as an inventor, I'm interested in things that people struggle with. It can be small things or big things or medium-sized things. And something like giving a TED talk presents this whole new set of problems that I can solve.

And identifying a problem is the first step in my process of building a useless machine. So before I came here, I sat down, and I thought of some of the potential problems I might have in giving this talk. Forgetting what to say, that people won't laugh -- that's you-- or even worse, that you'll laugh at the wrong things -- that was an OK part to laugh at, thank you.

Or that when I get nervous, my hands start shaking and I'm really self-conscious about it. Or that my fly has been open this entire time and all of you noticed but I didn't, but it's closed so we're all good on that one.

But one thing I'm actually really nervous about is my hands shaking. I remember when I was a kid, giving presentations in school, I would have my notes on a piece of paper, and I would put a notebook behind the paper so that people wouldn't be able to see the paper quivering. And I give a lot of talks. I know that about half of you in the audience are probably like, "Building useless machines is really fun, but how is this in any way or form a business?" And giving talks is a part of it. And the arrangers always put out a glass of water for you onstage so you have something to drink if you get thirsty, and I always so badly want to drink that water, but I don't dare to pick the glass up because then people might be able to see that my hands are shaking. So what about a machine that hands you a glass of water? Sold to the nervous girl in the googly-eye shirt.

Actually, I need to take this off because I have a thing ...

Oh.

I still don't know what to call this, but I think some sort of "head orbit device," because it rotates this platform around you, and you can put anything on it. You can have a camera; you can get photos of your entire head. Like it's really -- it's a very versatile machine.

OK, and I have -- I mean, you can put some snacks on it, for example, if you want to. I have some popcorn here. And you just put a little bit like that. And then you want to -- there's some sacrifices for science -- just some popcorn falling on the floor. Let's do the long way around.

And then you have a little hand. You need to adjust the height of it, and you just do it by shrugging.

It has a little hand.

I just bumped my mic off, but I think we're all good. OK, also I need to chew this popcorn, so if you guys could just clap your hands a little bit more ...

OK, so it's like your own little personal solar system, because I'm a millennial, so I want everything to revolve around me.

Back to the glass of water, that's what we're here for. So, I promise -- I mean, it still has -- it doesn't have any water in it, I'm sorry. But I still need to work on this machine a little bit because I still need to pick up the glass and put it on the platform, but if your hands are shaking a little bit, nobody's going to notice because you're wearing a very mesmerizing piece of equipment.

So, we're all good. OK.

Oh no, it got stuck. Isn't it comforting that even robots sometimes get stage fright? It just gets stuck a little bit. It's very human of them. Oh wait, let's go back a little bit, and then ...

Isn't it a beautiful time to be alive?

So as much as my machines can seem like simple engineering slapstick, I realize that I stumbled on something bigger than that. It's this expression of joy and humility that often gets lost in engineering, and for me it was a way to learn about hardware without having my performance anxiety get in the way. I often get asked if I think I'm ever going to build something useful, and maybe someday I will.

But the way I see it, I already have because I've built myself this job, and it's something that I could never have planned for, or that I could -- It's something that I could never have planned for. Instead it happened just because I was enthusiastic about what I was doing, and I was sharing that enthusiasm with other people. To me that's the true beauty of making useless things, because it's this acknowledgment that you don't always know what the best answer is. And it turns off that voice in your head that tells you that you know exactly how the world works. And maybe a toothbrush helmet isn't the answer, but at least you're asking the question.

Thank you.