And Dr. Terry Irwin, in 1983, called the tree canopy "the last biological frontier."

I would like to take you on a journey into the forest canopy and share what canopy researchers are looking for and how they communicate with people outside of science.

Start your journey on the forest floor of my research site in Costa Rica.

Overhanging leaves and branches reveal that the lower layers are very dark and very quiet.

And what I want to do is take you all up to the canopy. Instead of putting everyone on ropes and harnesses, I'm going to show you a very short clip from the National Geographic movie Heroes of the High Frontiers.

This was shot in Monteverde, Costa Rica, and I think it best describes what it's like to climb a giant Strangler Fig.

(music) (grunt) (rustle) What you see there is just the atmosphere of a field, with a vast array of flora and fauna adapted to make their way and live in the tree canopy.

Common groups like the sloths here are clearly adapted to the forest canopy and hang with very powerful claws.

But I would like to explain to you a more subtle kind of diversity and talk about ants.

There are 10,000 species of ants named by taxonomists (the people who describe and name animals).

Of these, 4,000 ants live only in the forest canopy.

One of the reasons I talk about Ali is for my husband. He is actually an ant taxonomist and when we got married he promised to name an ant after me and he did - Procryptocerus nalini, canopy ant.

We have two children, August Andrew and Erica, and he actually named Ali after them.

Therefore, it may be the only family of ants named after each of us.

But besides Jack and my children, my passion is plants, so-called epiphytes, that is, plants that grow on trees.

There are no roots on the trunk or on the forest floor.

Rather, it is the leaves that are adapted to block dissolved nutrients that come in the form of fog or fog.

These plants are extremely diverse, with over 28,000 species worldwide.

They grow in rainforests like this, but they also grow in the temperate rainforests found in Washington State.

These epiphytes are mainly dominated by mosses.

One thing I would like to point out is that in both temperate and tropical climates, as these living epiphytes die and decompose, they are actually building arboreal soil underneath.

And these mosses are produced by decomposition and are like peat moss in the garden.

They have an amazing ability to retain nutrients and water.

One of the amazing things I have discovered is that if you pull it up with me on a mat of epiphytes, you will find a network of connections underneath, the so-called canopy roots.

These are not epiphyte roots. These are roots that emerge from the trunk and branches of the host tree itself.

And those epiphytes actually pay landlords a small rent in exchange for being supported high above the forest floor.

Both myself and my colleague, who is a canopy researcher, were interested in the dynamics of canopy plants in forests.

We removed epiphyte mats and conducted stripping experiments to examine recolonization rates.

We expected them to grow up quickly and invade from the side.

However, it took a very long time, more than 20 years, to regenerate, and it turned out that it grew from the bottom.

And 25 years later, they still haven't gotten there and fully recolonized.

And I use this little image to say that this is what happens to moss.

If it's gone, it will disappear, but if you're really lucky, something may grow from the bottom.

(Laughter.) So recolonization is actually very slow.

These canopy communities are fragile.

Now, you and I look out through the pristine canopy and see this giant carpet of carbon.

One of the challenges facing forest canopy researchers today is trying to understand how much carbon is being sequestered.

We know it's a lot, but we still don't know how much carbon is taken out of the atmosphere, held in biomass, and moved through ecosystems, and by what processes.

So could we show that canopy-dwelling organisms are not just the insignificant green clumps high up in the tree canopy that Tarzan and Jane were interested in, but that they promote biodiversity, contribute to nutrient cycling in ecosystems, and also help stabilize the global climate?

Above the canopy, if you were sitting next to me and looking back from the primary forest ecosystem, you would see something like this.

Scenes of deforestation, deforestation, and forest fragmentation. It prevents the intact canopy tapestry from functioning as brilliantly as it did when undisturbed by humans.

I've also been looking at urban places like this and thinking about people who are cut off from trees in their lives.

People who grew up in a place like this didn't have the chance to climb trees or develop relationships with trees and forests like I had when I was a little girl.

this bothers me.

Being a forest ecologist here in 2009, it's not easy to keep asking these kinds of questions and figuring out how to answer them.

And especially as a petite brown woman attending a small college in the northern northwestern part of our country, far from the spheres of power and money, I have to ask myself some serious questions.

How can man and tree be reunited? ”

Well, I think we can do something.

As a scientist I have information and as a human being I know I can communicate with anyone inside or outside academia.

So that is what I started and here I would like to announce the International Canopy Network.

We consult the media for questions regarding the canopy. There is a Canopy newsletter. I have an email LISTSERV.

So we try to disseminate information to people outside of academia about the importance of the canopy, the beauty of the canopy, and the need for an intact canopy.

We also recognize that many of the products we make (such as videos) don't reach everyone. That's why we've pushed projects that reach people outside academia and outside the choirs most ecologists preach.

Treetop Barbie is a perfect example.

What my lab students and I do is buy a Barbie doll from Goodwill and Value Village, dress her up in clothes made by a seamstress, and send her off with a canopy handbook.

My feeling is -- (Applause) Thank you.

(Applause) -- We just took this pop icon and tweaked her a bit to be an ambassador who can get the message across that being a female scientist who studies treetops is actually really cool.

We have also developed partnerships with artists who understand and communicate the beauty of trees and canopies.

And I just want to talk about the creation of one of our projects, Canopy Confluences.

What I do is get all sorts of scientists and artists together and spend a week on these little platforms in the woods. And we look at nature, we look at trees, we look at tree canopies, and we communicate, exchange and express what we see together.

The results were fantastic.

Here are some examples.

This is a stunning installation by Bruce Chao, Dean of the Sculpture and Glassblowing Department at the Rhode Island School of Design.

He created this beautiful sculpture after finding a canopy nest at one of the canopy confluences in the Pacific Northwest.

I once had them dance on the canopy.

Jodi Lomasque and her wonderful theater company Capacitor joined me in the canopy of my rainforest property in Costa Rica.

They performed a wonderful dance called "Biome".

They danced in the woods, and we take this dance, my scientific advocacy communication, and also partner with environmental groups to go to different cities and do science, dance, and environmental activities that we hope will make a difference.

We brought musicians to the canopy and they made the music. And it was great music.

There was a wooden flutist, an oboist, an opera singer, a guitarist and a rapper.

And I brought a little part about Duke Brady's "Canopy Wrap."

(music) It's Duke!

(Applause.) This experience of working with Duke also inspired me to start a program called Sound Science.

I realized the power of Duke's song in terms of convincing urban youth—an audience—me, a middle-aged professor, of the importance of wild lands—to whom I had no hope of reaching.

So I invited the rap singer, Caution, to a youth group in downtown Tacoma.

We went out into the woods and I picked up a branch and Cauchon lapped it up and suddenly the branch was so cool.

Then the students came to our sound studio and made their own rap songs with their own beats.

Eventually they made a CD and brought it back to family and friends to express their experiences with nature in a unique medium.

The last project I will talk about is one that is very familiar to me and concerns the economic and social value associated with epiphytes.

In the Pacific Northwest, there is an entire industry that harvests moss from native forests.

These moss are collected from the forest. Used by the floriculture industry and florists to make arrangements and hanging baskets.

This is a $265 million industry and growing rapidly.

If you remember the bald man, you know that it takes decades for what is ripped from the trunks of the old-growth forests of the Pacific Northwest to come back.

So the industry as a whole is unsustainable.

As an ecologist, what can we do about it?

Well, my idea was that I could learn how to grow moss so I wouldn't have to bring it out of nature.

And I thought it would be great to have a partner to help me with this.

So I thought that imprisoned men and women who can't touch nature, who have a lot of time and space, who don't need sharp tools to work with moss, would be great partners.

And they have become great partners.

The best I can imagine.

they were very enthusiastic.

(Applause.) They were very enthusiastic about this work.

They learned how to distinguish different types of moss, and the truth is, they learned a lot more than an Evergreen University undergraduate could possibly do.

And they accepted the idea that they could help develop a research plan for growing these mosses.

As partners, we have been successful in identifying which species grow the fastest, and we are simply blown away by how successful this has been.

The prison warden was also very enthusiastic about this, so he started science and sustainability seminars inside the prison.

I have taken my scientific colleagues and sustainability experts to jail.

We gave talks once a month and actually ended up doing amazing sustainability projects in the prison: organic gardens, worm farming, recycling, watersheds, beekeeping. (Applause.) As our latest effort, we have been asked to expand this program to three more prisons with a grant from the Washington State Department of Corrections.

And our new project is to teach inmates and us how to care for the Oregon spotted frog, a highly endangered amphibian in Washington and Oregon.

There they will raise them—in captivity, of course—from eggs to tadpoles to frogs.

And many of them will be delighted to see the frogs they hatch, help grow, nurture, and migrate to protected wild areas, increasing the number of endangered species in the wild.

So, for many reasons, including ecological, social, economic, and perhaps even spiritual, this is a tremendous project, and I'm really looking forward to not only myself and my students working on this, but also promoting and teaching this method to other scientists.

As many of you know, the world of academia is a rather introverted world.

I try to help researchers go further and develop their own partnerships with people outside the academic community.

So I'm hoping that my husband, Jack, who is an ant taxonomist, could perhaps work with Mattel to create Ken, a taxonomist.

Perhaps Ben Zander and Bill Gates will collaborate on an opera about AIDS.

Or maybe Al Gore and Naturally 7 will make a song about climate change that makes you want to clap your hands.

So I think this is a bit of a fantasy, but also a reality.

Given the pressure we feel to protect the environment in this day and age, now is the time for scientists to reach out, and for those outside of science to reach out to academia as well.

My career began with using scientific tools to try to understand the mysteries of forests.

I must say that by building these partnerships that I have described to you, I have really opened my mind, to have a deeper understanding, to make different discoveries about nature and myself.

If you look into your heart, you will see a tree. This is actually the image of the real heart. There are trees in our hearts, and there are trees in your heart.

When we come to understand nature, we touch the deepest and most important part of ourselves.

In these partnerships, I also learned that people tend to divide themselves between IT people, movie stars, and scientists. But when we share nature and share perspectives on nature, we find common ground.

Finally, as a scientist, as a human being, and now as a member of the TED community, I feel I have better tools to go out into the trees and forests and into nature and make new discoveries about nature, about nature and our place in nature, wherever and whoever we are.

thank you very much.

(applause)

The Dirty Jobs staff and I were called to a small town called Craig, Colorado.

Just a few dozen square miles.

Located in the Rocky Mountains.

For those of you who haven't seen my role on the show yet, it's pretty easy.

I'm an apprentice and I work with people who do that job.

And my responsibility is to just try to keep up and to be honest about what a day in their life is like.

The job in question is a flock of sheep.

wonderful.

We went to Craig's and checked into the hotel. And the next day I realized that castration would be an absolute part of this piece.

Usually I don't do any research at all.

But this is a sensitive subject and I work for the Discovery Channel and I want to accurately portray whatever we are doing.

And we want to do it with the utmost respect for animals.

So I called the Humane Society and said, "I'm going to castrate a lamb. Can you tell me the deal?"

And they say, "Oh, that's very easy."

The band basically uses a slightly smaller rubber band like this.

This is actually what was around Trump that we got yesterday -- (Laughter) but there was a certain familiarity to it.

And I said, "So what exactly is that process?"

And they said, "The band is firmly attached to the tail.

Then apply another band firmly to the scrotum.

Blood flow slows down slowly. After a week, the part in question falls out.

"Great, I get it."

OK, I'll call SPCA to confirm this.

I called PETA as a joke, and they were reluctant to do so, but they confirmed.

OK, that's the basic way to do it.

Then I will go out the next day.

And I will be given a horse and I will go fetch the lambs and bring them to the corral that we have built and start the work of husbandry.

Melanie is Albert's wife.

Albert is the shepherd in question.

Melanie picks up the lamb and supports the right leg with one hand, and the left leg as well.

Lamb goes to the post and she opens it.

Albert comes in and I follow him too and the crew are around.

I always check which process runs first before trying.

I'm an apprentice, so I'll do it.

Albert puts his hand in his pocket to pull out the black rubber band, but instead comes out a knife.

And I'm like, "Hmm, that's not rubber at all."

(Laughter) And he just flipped it open in a way that caught the sun that was coming in over the Rocky Mountains, it was so — (Laughter) It was... it was impressive.

In the space of about two seconds, Albert stuck the knife right next to the lamb's buttocks, between the cartilage in the tail. Then the tail immediately disappeared and disappeared into the bucket I was holding.

A second later, he gripped his scrotum with his big thumb and stiff index finger.

And so he drew it toward himself, picked up the knife, and struck it at the end.

"Well, Michael, you think you know what's going to happen, but you don't?"

(Laughter) He cut it off, threw the tip over his shoulder, grabbed his scrotum and pushed it up, then lowered his head to obscure my vision.

But what you hear is a slurping sound and a sound like ripping Velcro off a sticky wall, no kidding.

can i stream the video?

No, I'm kidding, no -- (Laughter) I thought the best way to tell the story was in pictures.

I say, "Time out. Stop."

You know the show, but we use Take One. We don't do take-two.

No writing, no script, no nonsense.

We don't cheat or rehearse. We take what we get.

I said, "Please don't do this. This is ridiculous."

So -- (Laughter) "This is crazy.

we can't do that. ”

Albert said "What?"

And I said, "I don't know what happened, but this bucket has testicles in it. That's not how we do it."

He said, "Well, that's how we do it."

I said, "Why are you doing this?"

And before I let him explain, I said, “I want to do it the right way, with a rubber band.”

And he says, "Something like a humanitarian association?"

I said, "Yes, like the Humane Society.

Don't let the lamb scream and bleed.

We are on five continents, hey!

We are on the Discovery twice a day and we can't do that. ”

He says, "Okay."

Melanie picks up another lamb, places it on a post, attaches a band to the tail, and a band to the scrotum.

The lamb falls to the ground, the lamb takes two steps and falls, stands up and trembles a little, takes two more steps and falls.

I don't think this bodes well for this lamb.

Get up and walk to the corner.

Shaking, lying down, clearly in pain.

And I looked at the lamb and said, "Albert, how long?"

when does he get up ”

He was like, "One day?"

I said, "One day! How long will it take you to fall?"

"One week."

On the other hand, the lamb that he just had a little procedure on, you know, has stopped bleeding and is just jumping around.

He's chewing grass and having fun.

And in that moment, I was really blown away by how completely wrong I was.

(laughter) And I especially remember that the straw I had that day was ridiculously short. Because now I had to do what Albert did. And because there were about 100 of these lambs in the fold.

And all of a sudden all of this starts to feel like German porn and I'm like- (laughter) Melanie picks up the lamb, puts it on the post and opens it.

Albert hands me a knife.

The tail will come off when you enter.

Go in, grab the scrotum, and the tip will come off.

Albert instructs, "Push it there."

that's right.

that's right.

A testicle comes out. They look like thumbs and come straight towards you.

And he says, "Take a bite.

Just bite off. ”

(Laughter) And I heard his voice, I heard every word -- (Laughter) How did you get here?

How, I mean, how did you get here?

It's just, it's one of those moments when the brain runs wild on its own and suddenly I'm standing there in the Rocky Mountains and all I can think of is Aristotle's definition of tragedy.

Aristotle said that tragedy is the moment when a hero confronts his true identity.

(Laughter.) And I thought, 'What is this pretentious metaphor?

I don't like what I'm thinking right now. ”

With this idea stuck in my head and the vision never out of sight, I did what I had to do.

I went inside and received them.

I took them this way and pulled my head back.

And I'm standing with two testicles on my chin.

(Laughter) And now I don't understand -- I can't shake off this metaphor.

I'm still studying Aristotle's Poetics, and I'm thinking--out of nowhere, two terms flew into my head that I hadn't heard since my classics professor taught me them.

And that is "unawareness" and "circularity".

Ignorance and marginalization.

Ignorance is literally the transition from ignorance to knowledge.

That's what our network does. That is "Dirty Jobs".

And I work on anagolyzing up to my neck every day.

wonderful.

Another word, peripetea, it is the moment of the great tragedy, Euripides and Sophocles.

That's when Oedipus had a moment and he suddenly realized that the sexy chick he had slept with and had a child with was his mother.

That is Peripeti, or Peripeteia.

I have this metaphor running through my head -- I have dyslexia and dysplasia in my jaw -- (Laughter) I have to say, this is a very nice device.

Start looking for Peripetia and you'll find it everywhere.

Spent the entire movie trying to help a little kid who saw someone dead, and Dawn! -- "Oh, he's dead."

Peripetia. Look?

If the audience sees it the right way, it's shocking.

Do you know Neo from "The Matrix"?

"Oh, I live in a computer program.

It's weird. "

I have over 200 dirty jobs to do all the time, but that job brought something into my home in a way I was totally unprepared for.

And I was standing there looking at the happy lambs I had just soiled and they looked okay. Looking at the other little things, I was doing it the right way and it just blew me away. If I'm wrong about it, and if I'm wrong about it quite often, what other common misconceptions can I comment on?

Because I'm not a social anthropologist, but I have a friend who is a social anthropologist.

and i talk to him

(laughter) And he said, 'Hey Mike, look.

I don't know if your brain is interested in this sort of thing, but are you aware that you took shots in all conditions?

You have worked in mining, fishing, steel, every major industry.

Haven't our politicians been standing shoulder to shoulder with those they've been dying to get involved with every four years? ”

I can still see Hillary shooting shots of rye with steel workers down her chin.

"And if they have something to say about their thoughts as a whole, it may be time to think about it.

Because it's been four years. ”

I mean, it's in your head, your testicles are on your chin, and your thoughts are flying.

And after that shoot, "Dirty Jobs" didn't change at all in terms of the show, but it changed me personally.

And now when I talk about the show, I don't just tell the story you heard and got 190 likes.

I do, but I also start talking about other things I did wrong. Some of the other notions about work that I have assumed are sacred, but they really aren't.

People who do dirty work are happier than you think.

As a group they are the happiest people I know.

And I don't want to start whistling "Look for the Union Label" or some happy worker crap.

My point is, they are well-rounded people who do the unthinkable.

Roadkillpicker Upper whistles at work, I swear to God I did with them too.

They have an amazing symmetry in their lives.

And watch over and over and over again.

So I started wondering what would happen if I challenged these sacred cows.

Follow your passion -- we've been talking about it here for the past 36 hours.

follow your passion. what's wrong with that?

This is probably the worst advice I have ever received.

(Laughter) If you chase your dreams, you'll go bankrupt, right?

I mean, that's all I heard growing up.

I didn't know what to do with my life, but I was told that if I followed my passion, I would be successful.

I can give you 30 examples right now.

Las Vegas pig farmer Bob Combs collects leftover food from casinos and feeds it to his pigs.

why?

His pigs grow twice as fast as they normally would because there's so much protein in what we don't eat, and he's one of the richest pig farmers.

He's green, he spends his days in incredible service, and he stinks like hell, but God bless him.

You ask him, "Have you followed your passion here?"

and he will laugh at you

What this man is worth - he just turned down an offer of about $60 million for his farm outside of Las Vegas.

He didn't follow his passion.

He stepped back to see where they were going, but they went in the opposite direction.

Dairy farmer Matt Freund in New Canaan, Connecticut, woke up one day to find that cow manure was more valuable than milk for making biodegradable plant pots.

Now he sells it to Walmart, right?

So I started looking at passion and weighing efficiency against effectiveness.

As Tim said earlier, it's a big difference.

I started to value teamwork and determination.

And basically, all the clichés they call “success” that hang in that schmalt art in boardrooms around the world right now, stuff like that, all of a sudden turned upside down.

safety. Safety first...

Back to OSHA, PETA, and the Humanitarian Association, what if OSHA got it wrong?

I mean, this is heresy, what I'm trying to say, but what if safety really was number three?

right?

(Laughter) No, I really mean that.

What I'm trying to say is that I care about my own safety doing these crazy jobs as much as the people I work with, but the people who actually get the job done aren't talking about safety first.

They know that other things come first: the job of doing the job, the job of getting it done.

And I'll never forget the time I rode a crab boat with the Deadliest Catch buddies in the Bering Sea—which I'm also working on in the first season.

We were about 160 miles off the coast of Russia. Fifty feet of ocean, big waves, green water over the wheelhouse, right?

In the most dangerous environment I have ever seen, I was back with a guy and banging pots.

So I'm 40 feet above the deck, and it's like I'm looking down at the top of my shoe, and I'm doing this in the water.

I hurried down, entered the wheelhouse, and with some disbelief said: "Captain, OSHA?"

and he points it out.

(Laughter) But in that moment, what he said next is not repeated in Lower 48.

The same thing cannot be repeated at any factory site or construction site.

But he looked at me and said, "Son." He's the same age as me, by the way, he calls me "son". I love it. He said, "Son, I am the captain of a crab boat.

My responsibility is not to bring you home alive.

My responsibility is to bring you home wealthy. ”

(laughs) It's up to you to want to go home alive. ”

And the rest of the day is safety first.

So the idea is that we create this sense of complacency when we only talk about someone else's responsibilities as if they were ours and vice versa.

Anyway, many things.

I could go on and on about the many small distinctions we made and the endless list of ways I went wrong.

But at the end of the day, I've come up with a hypothesis, and I'm going to share it with you in the remaining 2 minutes and 30 seconds.

It's like this: As a society, we have all declared war on work.

It's a civil war.

We didn't set out to do it, we didn't twist the mustache in a Machiavellian way, but we did it.

And we've waged this war on at least four fronts, and of course Hollywood.

The way we portray people working on television is ludicrous.

If you have a plumber, admit he weighs 300 pounds and has a big crack in his butt.

You see him all the time.

That's what a plumber looks like, right?

We turn them into heroes, we turn them into punch lines.

That's what TV does.

We try very hard to avoid that in "Dirty Jobs". That's why I work and I don't cheat.

What do many of the commercials that flow as messages actually say?

“If you could work a little less, not have to work so hard, go home a little earlier, retire a little earlier, finish work a little earlier, your life would be better.”

Washington?

We can't even begin to talk about the deals and policies in place that affect the ultimate reality of the jobs being offered. Because I don't know. All I know is that it is the front line of this war.

And here, folks, is Silicon Valley.

I mean, how many people have iPhones today?

How many people have BlackBerrys?

we are connected we are connected

I don't for a second think that anything bad has come out of the technological revolution.

Unfortunately this crowd was not.

(Laughter) But I think innovation without imitation is a complete waste of time.

And no one celebrates imitation the way the members of "Dirty Jobs" know they must.

With no one building the same interface, the same circuits, the same boards over and over again, the iPhone is what makes it all possible, with the same potential as the genius it has inside.

So I got this new toolbox. Look?

Our tools today look nothing like shovels and pickaxes.

It looks just like the one we carry around.

And all of that has taken a collective toll, and so many jobs have been marginalized.

And I realized maybe too late in this game -- I hope not. I don't know if I can do these things 200 more times -- but I will do as many as I can.

And for me, the most important thing to know and take seriously is the fact that I was wrong about so many things, not just the testicles on the chin.

I made a lot of mistakes.

So we think that "we" is me (laughter) and what we have to do is talk about PR campaigns for jobs like manual labor and skilled labor.

Someone needs to go out and talk about forgotten benefits.

I'm talking about my grandfather, maybe when we were growing up, but we sort of lost, I mean, a little bit.

Barack wants to create 2.5 million jobs.

This labor war that exists, I think, has casualties, like all wars.

Infrastructure is the first issue, and declining college enrollment is the second.

Every year there are fewer electricians, carpenters, plumbers, welders, pipe installers and steam installers.

The infrastructure jobs that everyone is talking about creating are people who have been declining over and over again.

Meanwhile, the American Society of Civil Engineers says we would have to spend at least $2 trillion to create a hole in our infrastructure, which is currently rated D-minus.

So if I were to run for something, and I'm not, I'd simply say that the jobs we hope to create and the jobs we want to create won't stick if they're not the jobs people want.

We know that the purpose of this meeting is to celebrate what is close and dear to us, but we also know that clean and dirty are not opposites.

They are two sides of the same coin, just like innovation and imitation, risk and responsibility, cyclicality and ignorance, like that poor lamb that I don't want you to tremble anymore, and like my time gone by.

It was a lot of fun talking with you.

And get back to work?

(applause)

So who am I, anyway?

When people ask, "What are you doing?"

I say "doing hardware" because it conveniently encompasses everything I do.

And I casually mentioned it to a venture capitalist at a Valley event recently, and he said, "How strange."

(Laughter) And I was really dumbfounded.

And I should have said something really clever.

And now I have had some time to think about it. "Well, if you look at the next 100 years and see all these problems in the last few days, most of the big problems -- clean water, clean energy, and materials that are interchangeable in some ways, cleaner and more functional -- look all hardware problems to me.

This does not mean that software, information and calculations should be ignored. ”

And in fact, that's probably what I'm about to tell you.

So in this talk, I will talk about how we make things and what the new ways we make things are in the future.

Now, if you're a "do this, do that" speaker and you fill out all these forms, you get a ton of spam from TED, and the truth is, I don't know how they describe you. And I had a flash on my desk that they might be introducing me as a futurist.

And I've always been leery of the word "futurist." Because you seem doomed to failure because you are really unpredictable.

And I laughed about this with some very smart colleagues and said, "Well, if I had to talk about the future, what would it be?"

And a wonderful man named George Homsey said, "Oh, the future is great.

It's a lot stranger than you think.

We're going to reprogram the bacteria in your gut to make your poop smell like peppermint. ”

(Laughter) So you might think it's really crazy, but there are some pretty amazing things going on that make this possible.

So this is not my work, but my friend's work at MIT.

This is called the Registry of Standard Biological Parts.

This is led by Drew Endy and Tom Knight and a few other very good people.

Basically what they are doing is looking at biology as a programmable system.

Think of proteins literally as subroutines that can be chained together to run a program.

Now this is actually becoming a very interesting idea.

This is a state diagram. It's a very simple computer.

This is a 2-bit counter.

So this is essentially the equivalent of two light switches for computation.

It was built by a group of Zurich students for a biology design competition.

And based on results from the same contest last year, a team of University of Texas students programmed bacteria to sense light and turn it on and off.

This is interesting because it allows you to do "if-then-for" statements within materials and structures.

This is a very interesting trend. Because we once lived in a world where everyone casually said that form follows function. But I kind of grew up in that world, I guess. You listened to Neil Gershenfeld yesterday. I was in his lab, a world where information defines form and function.

I've been thinking about it for six years, and to show the power of art over science, this is actually one of the comics I write. These are called "howtoons".

I work with an amazing illustrator named Nick Dragotta.

It took me six years at MIT that many pages to explain what I was doing, and he took one page. This is our muse, Tucker.

He's an interesting kid - and his sister Celine - and what he's doing here is watching his cheerios self-assemble in a cereal bowl.

And in fact, you can program the self-organization of things, so dip the ends in chocolate and start changing hydrophobicity and hydrophilicity.

In theory, if you program them enough, you should be able to do very interesting things and create very complex structures.

In this case, he performed self-replication of complex 3D structures.

That's what I've been thinking about for a long time. Because that's how we make stuff now.

This is a silicon wafer, essentially two-dimensional, layer upon layer.

Functionally, you know, people would say [unintelligible], but right now it's around 65 nanometers.

Radiolarian on the right.

It is a single-celled organism that is ubiquitous in the ocean.

And its feature size reaches about 20 nanometers, and it is a complex 3D structure.

Knowing how to build things this way will allow you to do more with computers and things in general.

The secret of biology is that it builds computation into the way things are made. So this little thing right here, the polymerase, is essentially a supercomputer designed to replicate DNA.

The ribosome here is another little computer that helps translate proteins.

I thought in the sense that incorporating biological materials would be great, but could we do something similar?

Can we achieve self-replicating behavior?

Can we get complex 3D structures that automatically assemble within an inorganic system?

This is because inorganic systems have advantages such as faster semiconductors.

This is part of my research on how to achieve autonomous self-replicating systems.

And this is Babbage's kind of revenge.

These are state machines with five states.

In other words, there are about three light switches in a row.

In neutral state, they do not combine at all.

Now, once we create these strings, i.e. bitstrings, we can replicate them.

So start with white, blue, blue, white.

it encodes. It will be copied. 1 results in 2, then 2 results in 3.

And this kind of replication system was perfected.

It was actually the work of Lionel Penrose, the father of tile maker Roger Penrose.

He did much of this work in the 60's, so much of this logical theory lay dormant as the digital computer revolution progressed, but it is now being revived.

Now let's introduce hands-free autonomous self-replication.

So the video tracked the input string (green, green, yellow, yellow, green).

We set them off with this air hockey table.

You see, high science uses an air hockey table -- (Laughter) -- it makes me dizzy looking at it for too long, but what you're really looking at is a copy of the original string that comes out of the parts bin right here.

You now have autonomous duplication of bitstrings.

So why would you want to duplicate a bitstring?

Well, it turns out there's another very interesting meme in biology. What it does mean is that you get a linear string that's convenient to copy, and you can fold it into an arbitrarily complex 3D structure.

So I was trying to get an engineer's opinion. Can we build mechanical systems out of inorganic materials that do the same thing?

What I am showing here is that a 2D shape (B) can be assembled from a set of components following very simple rules.

And the whole point of using very simple rules here, and using the very simple state machines of previous designs, is that no digital logic is needed to do the calculations.

Then you will be able to scale things much smaller than microchips.

So you can literally use them as small components in your assembly process.

So I think Neil Gershenfeld showed me this video on Wednesday, and I'll show you it again.

This is literally the sequence of colors for those tiles.

Each color has a different magnetic polarity that uniquely identifies the structure that emerges from its arrangement.

Well, hopefully anyone who knows a little about graph theory will see this and be satisfied that it can also do arbitrary 3D structures. In fact, you can take a dog, cut it up, and reassemble it into a linear string that folds out of the sequence. And now we can actually define that 3D object as a sequence of bits.

When you start looking at the world from a slightly different perspective, it becomes a very interesting world.

And the universe is now a compiler.

So I'm thinking about what a program is for programming the physical universe.

And how do we think about materials and structures as problems of information and computation?

It's not just where you attach the microcontroller to the endpoint, its structure and mechanics is the logic, that's the computer.

After fully absorbing this philosophy, I began to look at many issues a little differently.

If we think of the universe as a computer, we can see this water droplet performing the calculations.

Set some boundary conditions such as gravity, surface tension and density, press 'run' and magically the universe will generate a perfect ball lens.

So this really applies to the following problem: That means between 500 million and 1 billion people worldwide do not have access to cheap eyeglasses.

So, can we build a machine that can produce any prescription lens on the spot right away?

This is literally the machine that defines the boundary conditions.

If it is circular, make a spherical lens.

Astigmatic lenses can also be made if they are elliptical.

Then put the membrane on it and apply pressure. Here are some of the additional programs.

And literally, using just these two inputs (the shape and pressure of the boundary conditions), we can define an infinite number of lenses that cover the range of human refractive error from minus 12 diopters to plus 8 diopters, up to a cylindrical shape of 4 diopters.

And literally pour in the monomer.

I'm going to do Julia Childs here.

UV irradiation for 3 minutes.

And when cooking is complete, reverse the pressure on the membrane. jump out

I've seen this video, but I'm still not sure if it ends correctly.

(Laughter) So let's reverse this. This is such an old movie that the new prototype actually has both surfaces flexible, but you get the point.

The lens is now complete. It literally just pops out.

That's the shape of Yves Klein's glasses next year.

And it turns out to have a moderate power of about minus 2 diopters.

Rotate it against this side shot and you'll see it has a cylinder and is literally programmed into the physics of the system.

So this kind of thinking about structure as computation and structure as information leads to other things like:

This is what the staff at SQUID Labs are currently working on, called an "electronic rope."

Think about the rope, literally. It has a very complex weave structure.

In the unloaded state, it is a single structure.

Different loads have different structures. And you can actually take advantage of it by inserting a very small number of conductive fibers and actually making it a sensor.

So this will be a rope that can perceive the load on the rope at a particular point on the rope.

Just by thinking of the physics and matter of the world as a computer, you will be able to do something like this.

A little bit more here.

I would like to casually tell you what I think about this.

One of the things I'm very interested in about this right now is, if we really take this view of the universe as computers, how do we make things in a very general sense, and how can we share how we make things in a general sense, much like we share open source hardware?

And many talks here support the benefits of having many people look at problems, share information, and work together.

So the convenience of being human is that we can travel in linear time, and unless Lisa Randall changes that, we will continue to travel in linear time.

This means that whatever you do or build will generate a series of steps. I think 70's Lego did this brilliantly and most elegantly.

But I can show you how to build things in order.

So, when I was thinking about how to generalize how to make various things, I ended up with something like this, right?

And I think this applies to a very broad, so to speak, many concept.

As you know, Cameron Sinclair said yesterday, "How can we all come together in design around the world to make housing for humanity a reality?"

If you've seen Amy Smith, she talks about getting MIT students to work with the Haitian community.

And I think we need to redefine and rethink how we define structures, materials and assemblies. Then we can really share information about how to do these things in a deeper way and build structure on top of each other's source code.

I'm not sure yet how exactly this will be done, but as you know it's something that's being actively considered.

So the question arises, is this the compiler? is this a subroutine?

Interesting stuff like that.

Maybe I'm getting a little too abstract, but you know, this, back to cartoon characters, is some kind of universe, or another view of the universe, and I think it's going to be very prevalent in the future, from biotechnology to materials assembly. It was great to hear Bill Joy.

They're starting to invest in materials science, but these are new things in materials science.

How can we incorporate real information and real structures into new ideas to see the world in a different light? And it's not the binary code that defines the computers of the universe, but a kind of analog computer.

But it's definitely interesting as a new world view.

I have gone too far. That's right.

I think I have a few minutes of questions. Or I can show you. I think I was also told in the introduction that I was going to extremes. So it may be necessary to explain it.

So I'll try to do that in this short video.

So this is actually a 3,000 square foot kite and also the smallest energy surface.

So let's go back to droplets and think about the universe in a new way.

This is a kite designed by a man named Dave Krupp.

And why would you need a 3,000 square foot kite?

So it's a kite as big as your house.

So you want to be able to tow your boat very fast.

So I've been working on this a bit too, along with a few others.

But you know, this is another way of looking at it. Abstracted again, this is the structure defined by the physics of the universe.

You can just hang it up as a bed sheet, but again all the physics calculations give you an aerodynamic shape.

With such a system you can practically double the speed of your boat. That's another interesting aspect of the future.

(applause)

The new me is beauty.

(Laughter) Well, people used to say, 'Norman's fine, but if you follow him, everything will work, but it's going to be ugly.'

Well, I didn't mean to...

This is beautiful, isn't it?

Thank you for setting up your display.

I mean, it's just great.

I have no idea what it's good for or what it's good for, but I want it.

And that's my new life.

My new life is trying to understand beauty and what 'beauty' and 'feelings' are.

Your new self is all about keeping things neat and fun.

And this is the Philippe Starck juicer produced by Alessi.

It's just right. It is fun. I keep it at home because it's so much fun, but it's in my front door and I don't use it to make juice.

(laughs) In fact, I bought the gold-plated special edition, and it came with a little piece of paper that said, "Don't use this juicer to make juice."

Acid will ruin the gold plating.

(laughs) I actually poured a pack of orange juice into a glass to take this picture.

(Laughter) And there's a nice knife under that.

It is a global Japanese knife.

First of all, look at its shape. It's just amazing to look at.

Secondly, the balance is very beautiful, the hold is good, and the feel is good.

And third, it's very sharp, so it cuts quickly.

Fun to use.

So all in all, right?

Beautiful and functional.

And you'll see that I have a theory of emotion because I can tell a story about it and it makes it introspective.

And these are the three components.

A group led by Hiroshi Ishii of the MIT Media Lab prepared a ping-pong table, placed a projector on top of it, and projected images of fish swimming in water onto the table.

When playing table tennis, every time the ball hits a part of the table, ripples spread and the fish escape.

But, of course, then the ball hits the other side and the ripple hits the fish. The poor fish cannot find peace and quiet.

(laughs) Is that a good way to play table tennis?

No, but are you having fun?

yes! yes.

Or look at Google.

For example, typing "feelings and design" will return 10 pages of results.

In other words, Google just took its own logo and spread it around.

“We got 73,000 results.

This is from 1 to 20. Next" is displayed and o is given for the number of pages.

It's really simple and delicate.

I think there are many people who have seen it but didn't notice it.

That is what the subconscious mind is aware of. Perhaps it was a kind of pleasure, and you didn't know why.

And it's just clever.

And, of course, the coolest thing is that when I type in "design and emotion," the first response out of those 10 pages is my website.

(Laughter) Well, strangely enough, Google lies. Because when you type "design and emotion" it says "you don't need 'and'". We'll do it anyway. ”

That's fine.

I typed "Design Emotion" there and my website never came up first again.

I was third.

Oh, that's another story.

The New York Times had a great review of the MINI Cooper car.

"As you know, this car has a lot of flaws.

Buy it anyway.

It's a lot of fun to drive. ”

And looking inside the car, I mean, I loved it, I wanted to see it, and I rented it. This is my son taking pictures while driving. Looking inside the car, the overall design is pleasing.

It's round and beautiful.

The controls work great.

That's my new life. It's all about fun.

I really feel that having fun is more effective, but it didn't make any sense until I finally figured it out...

I'm going to put a board on the ground.

So imagine walking on a plank about 2 feet wide and about 30 feet long. You can walk on it without looking, move forward and backward, and even jump.

no problem.

I'm going to put that board about 300 feet in the air -- and I'm not going to get anywhere near it, thanks.

Intense fear paralyzes you.

It actually affects how the brain works.

So Paul Safo said before his talk that he was really restless until just a few days or hours before his talk, but that anxiety really helped him focus.

That's how fear and anxiety work. This provides so-called depth-first processing, allowing you to focus without distractions.

And I couldn't force myself to get over it.

Some people can do it now, such as circus workers and steel workers.

But it really changes the way you think.

And psychologist Alice Eisen did this wonderful experiment.

She brought in a student to solve the problem.

So she took people into a room and there was a string hanging down and a string hanging down here too.

The room was empty except for a table full of papers, scissors and other trash.

And she brought them in and said, 'This is an IQ test and it determines how well you do in life.

Could you please tie those two strings together? ”

So they took one string and pulled it over so they couldn't reach the other string.

I still can't get there.

And basically none of them could solve it.

You bring in a second group of people and say, "Oh, before we start, I got a box of candy, and I don't eat candy."

How about a candy box? ”

And they seemed to like it, not very happy, but just a little bit.

Well, they solved the problem.

And it turns out that anxiety releases neurotransmitters in the brain that make concentration a depth priority.

And when you're happy, or what we call positive valence, dopamine is released in your prefrontal cortex, making you a breadth-first problem solver. It's easy to get interrupted. You think outside the box.

That's what brainstorming is all about, right?

Make yourself happy with brainstorming, play games, say "no criticism" and you'll come up with a stream of weird and wonderful ideas.

But the fact is, if you were always like that, you would never get the job done. Because you go to work saying, "Oh, I found a new way of doing things."

You have to set deadlines to get your work done, right?

It makes me uneasy.

Happiness changes how your brain works. Things get better because you get more creative.

When a small problem arises, it's like, "Oh, I'll try to fix it."

Not a big deal.

There is what I call visceral-level processing, and there is visceral-level design.

Biology -- We've adapted through biology to prefer bright colors.

It is especially good that mammals and primates like fruits and bright plants. Because when you eat the fruit, it spreads the seeds.

The brain contains an amazing amount of stuff.

We hate bitter tastes, we hate loud noises, we hate hot and cold temperatures.

We don't like scolding. We hate frowns. We like symmetrical faces, and so on.

So it's on a visceral level.

In design, intuition can be expressed in many ways, such as choosing a typeface or representing a hot, evocative red.

Or a 1963 Jaguar: It's actually a poor car, it breaks all the time, but the owner loves it.

And it's beautiful - it's in the Museum of Modern Art, New York.

Water Bottles: Buy for the bottle, not for the water.

And when people are done with it, they don't throw it away.

They save it - you know, it's like an old wine bottle, you save it for decoration or maybe refill it with water, which proves it's not water.

It's all about intuitive experience.

The middle level of processing is the operational level, where most of the actual processing takes place.

The viscera resides in the subconscious and you are unaware of it.

Behavior is subconscious and you are not aware of it.

Almost everything we do is done subconsciously.

I walk around the stage, not paying attention to leg control.

I do a lot. Most of my talk is about the subconscious. It's been rehearsed and thought through a lot.

Most of what we do is done subconsciously.

Automatic or skilled behavior is subconscious and controlled by behavioral planes.

Operational design is not only about ease of use and understanding, but also the feeling of control, such as feel and weight.

That's why Global knives are so clean.

It's very well balanced and very sharp, so you really feel in control of the cut.

Or just drive a high-performance sports car over a tough curb and feel in complete control of your surroundings.

Or sensual sensations.

This is a Koehler shower, a waterfall shower, and actually the knob underneath is all a showerhead.

The shower jets all over your body and you can stay in the shower for hours. By the way, it recirculates the same dirty water, so no water is wasted.

(Laughter) Or this -- this is a very nice teapot I found at a high tea at the Four Seasons Hotel in Chicago.

Ronnefeldt slanted teapot.

The teapot looks like this, but to use it, put the tea on your back and pour the water.

The water will then seep out onto the tea.

And tea is to the right of this - tea is to the right of this line.

There is a little ledge inside and the tea is placed there and the water is filled that way.

And when the tea is ready or nearly ready, tip the tea.

This means the tea is partially covered until the brewing is complete.

And when you're done drinking, you put it upright, and the tea--remember--is on this line, and the water only goes up to this--so that the tea doesn't get in.

Communicating on it, that's the work of emotions.

Emotions are all about acting. Emotions are just acting.

The world is safe.

Cognition is understanding the world, feeling is interpreting it, saying good, bad, safe, dangerous, and ready for action. This is why the muscles are tensed and relaxed.

That is why we are able to convey the feelings of others. They work subconsciously, except that we evolved to make facial muscles emotional.

Well, because it has emotion in it, signaling to the waiter, "Hey, I'm done. Now stand up."

Then a waiter can come over and say, "Would you like more water?"

It's kind of beautiful. What a great design!

And the third level is reflexive. So if you like your superego, it's that little part of your brain that you can't control your actions, you can't perceive sensations, you can't control your muscles.

Find out what's going on.

A little voice in your head is looking at it and saying, "That's good, that's bad."

Or, "Why are you doing that? I don't know."

The little voice in your head is the seat of your consciousness.

Introducing a great reflective product.

"You know I've owned a lot of cars in my life, all sorts of rare cars, but I've never had a car that grabbed so much attention," Hummer owners said.

It's about caution. It's not about the car, it's about their image.

If you want a more positive model, this is the GM car.

And maybe the reason you buy it now is because you care about the environment.

And the first few cars are very expensive, and you will buy it to protect the environment, if not perfect.

But it's also a reflective design.

Or an expensive watch that can impress people - "Oh, I didn't know you had that watch."

By contrast, this is a pure action watch that will probably keep more accurate time than the $13,000 watch we just mentioned.

This is a clear Don Norman watch.

And what's great is pitting one emotion against the other, hitting the instinctive fear of falling into the "okay, okay, safe, safe" reflex.

If the amusement park was rusty and worn out, I would never get on the rides.

That is, one is at odds with the other.

Another nice thing...

(Laughter) Jake Kress is a cabinetmaker and makes this incredible piece of furniture.

And this is his chair with claws. The poor little chair has lost the ball and is trying to get it back without anyone noticing.

And what's so great is how you take the story.

And that's where emotions are good.

That's the new me.

From now on, I will only say positive things.

(laughter) (applause)

I have been intrigued by this question of whether a sixth sense can be evolved or developed. A sixth sense is the sense that allows us to seamlessly access and easily access meta-information that can help us make the right decisions about what we encounter, or information that might exist elsewhere.

Some might argue, "So today's mobile phones already have such a feature?"

But I would say no.

When you meet someone here at TED, of course, it's the best networking place of the year. You don't shake someone's hand and then say something like, "Can you hold a moment while I pull out my phone and do a Google search?"

Or when you go to a supermarket and you're standing in a wide aisle with different types of toilet paper, you don't pull out your phone, open your browser, go to a website and try to decide which of these different toilet papers is the greenest thing to buy.

So you don't have easy access to all this relevant information that can help you make the best decisions about what to do next and what actions to take.

So my research group at the Media Lab has developed a series of inventions that allow users to access this information in some kind of easy way without changing their behavior.

And I'm here to announce our latest effort, and our most successful effort to date. This is still a work in progress.

I'm actually wearing this device right now, and it's like putting together off-the-shelf components. By the way, the price is only $350 at this point.

I wear a camera, just a webcam, and a battery-powered portable projection system with a small mirror.

These components communicate with a mobile phone in your pocket that acts as a communication and computing device.

And the video here features my student Pranav Mistry. He is truly a genius who implemented and designed this entire system.

And with this system, we see him step up to any surface and begin using his hands to interact with the information projected in front of him.

The system tracks four critical fingers.

In this case, he's wearing a simple marker cap that you recognize.

However, if you want a more stylish version, you can also paint your nails in a different color.

And the camera basically tracks those four fingers and recognizes his gestures, so you can, for example, navigate to a map of Long Beach or zoom in and out.

The system also recognizes symbolic gestures, such as the "take a picture" gesture, and takes a picture of what's in front of you.

And when you return to the Media Lab, you can climb any wall, project all the photos you've taken, sort and organize them, resize them, etc., all again using natural gestures.

So maybe you came here two years ago to see a demo by Jeff Han. Or you might be thinking, "Doesn't this look like a Microsoft Surface Table?"

Of course, you can also interact using natural gestures, hands, etc.

The difference here, however, is that you can use any surface, and if nothing else is available, you can walk to any surface, including your hand, and manipulate this projected data.

This device is completely portable and can -- (applause) (end of applause) So one key difference is that it's completely mobile.

Another, more important difference is that mass production won't make tomorrow's price more expensive than today's phones, it won't really make the package bigger, and it might look a lot more stylish than this version I'm wearing around my neck.

But the reason we're really excited about this device, other than letting us make our fantasies of being cool like Tom Cruise in Minority Report come true, is that it can actually act as one of those sixth sense devices that give us relevant information about what's in front of us.

There we see Pranav going to the supermarket to buy some paper towels.

And when the user picks up the product, the system uses image recognition or marker technology to recognize the product the user is picking up and turn on a green light or an orange light.

He can ask for additional information.

So this particular choice here is a particularly good one considering his personal criteria.

Some people may want to choose the toilet paper with the most bleach, not the greenest.

(Laughter) When you pick up a book at a bookstore, you get an Amazon rating. It is reflected on the cover of the book.

By the way, this is a book by Huang, the last speaker, which, by the way, is very highly rated on Amazon.

There, Pranav can turn the pages of a book and see additional information about it: reader comments, perhaps information by his favorite critics, and so on.

When he looks at a particular page, he finds annotations, perhaps by experts or friends, that give him a little extra information about what's on that particular page.

Reading a newspaper never has to be old.

(Laughter) You can get video annotations about the event you're reading.

Get the latest sports scores and more.

This is even more controversial.

(Laughter) When you interact with someone on TED, you might see a word cloud of words or tags associated with that person on their blog or personal web page.

In this case, the student is interested in things like cameras.

When you receive your boarding pass on your way to the airport, it will tell you if your flight is delayed, your gate has been changed, etc.

And if you want to know what time it is, it's as easy as drawing a clock on your wrist -- (laughter) (applause).

That said, we're working so far in developing a sixth sense that will give you seamless access to all relevant information about anything you might encounter.

My student Pranav, like I said, he's really a genius.

(Applause and cheers) (End of applause) He deserves a lot of applause, because in fact I don't think he's slept much in the last three months.

And his girlfriend probably isn't too happy about him either.

But it's still not perfect and quite a work in progress.

And perhaps within the next decade, we will have the ultimate sixth sense brain implant.

thank you.

(applause)

I was speaking to a group of about 300 children aged 6 to 8 at the Children's Museum. So I brought a bag full of legs, similar to the ones you see here, and laid them out on the table for the children.

And in my experience, children are naturally interested in what they don't know, don't understand, or are unfamiliar with.

They learn to fear the difference only when adults influence them to act that way, censoring their natural curiosity or suppressing questions in the hope of being well-mannered little children.

So I imagined a first grade teacher with some unruly kids in the lobby saying, "Now, whatever you do, don't stare at her feet."

But of course, that's the point.

That's why I was there and wanted to encourage them to see and explore.

So I made a deal with the adults that the children could go in alone for two minutes without an adult.

The door opens and the kids come down to the foot table, pecking, pecking, wiggling their toes, putting their full weight on their sprinting legs to see what happens.

And I said, "Kids, I'm really in a hurry. I woke up this morning and decided I wanted to be able to jump over a house. Not too big, not two or three stories high. But what kind of legs would you make me, an animal, a superhero, a cartoon character, whatever you can think of right now?"

Then I heard a voice say, "Kangaroo!"

"No no no! It should be a frog!"

"No, it's a go-go gadget!"

"No, no, no! It should be The Incredibles."

Other things I don't know or don't know well.

Then an eight-year-old boy said, "Hey, why don't you want to fly too?"

And the whole room, including me, was like, "Yeah."

(Laughter.) And just like that, I went from a woman whose children would have been trained to be viewed as “disabled,” to a woman whose bodies had potential that their bodies didn’t yet have.

A person who might be a psychic.

interesting.

Some of you actually saw me at TED 11 years ago.

And there's been a lot of talk about how this conference is life-changing for both speakers and attendees, and I'm no exception.

TED was literally the starting point for the next decade of my life's quest.

At the time, the leg I presented was groundbreaking as a prosthetic leg.

As some of you may have seen on the stage yesterday, we knit carbon fiber sprinting legs modeled after cheetah hind legs.

And those very lifelike, essentially painted silicone legs too.

So at that time I had the opportunity to call on innovators outside the traditional medical prosthetics community to bring their talents to the science and art of leg building.

That way we can stop compartmentalizing form, function and beauty and assigning different values ​​to them.

Fortunately, many people responded to the call.

And, interestingly enough, the journey began with TED conference attendee Chee Perlman. I think he's coming to an audience somewhere today.

She was the editor of ID magazine at the time and provided me with the cover story.

A wonderful journey started here.

A strange encounter was happening to me at the time. I have been invited many times around the world to give lectures on cheetah foot design.

And after the conference, after my talk, people came to me, both men and women.

And then the conversation goes like this: "Amy knows you are very attractive.

You don't look handicapped. ”

(Laughter) I thought, "Wow, I don't feel like I'm disabled."

And it really opened my eyes to this conversation where you can explore beauty.

What should a beautiful woman look like?

What is a sexy body?

And interestingly, what does it mean to be disabled from an identity perspective?

So Pamela Anderson has more prostheses on her body than I do.

No one calls her disabled.

(Laughter) So the magazine went through graphic designer Peter Saville to fashion designer Alexander McQueen and photographer Nick Knight. They too were interested in exploring that conversation.

So, three months after TED, I was on a plane to London doing my first fashion shoot, and this cover was born. "fashionable"?

Three months later, I did my first Alexander McQueen runway show with hand-carved wooden legs made from solid ash.

No one knew it - everyone thought it was a wooden boot.

In fact, I have them on stage. Vines, magnolias, really nice.

Poetry is important.

Poetry elevates the mundane and neglected subject into the realm of art.

It can turn what might have been terrifying people into something that encourages them to see more, stare a little more, and perhaps understand.

I learned this first hand on my next adventure.

Artist Matthew Barney is in a film production called 'The Cremaster Cycle'.

This is where I really realized that my feet could become wearable sculptures.

And even at this point, I began to move away from the need to replicate humanity as the sole aesthetic ideal.

So we created what people affectionately call glass legs, even though they're actually optically clear polyurethane, aka the material in which bowling balls are made.

heavy!

Then we made a leg cast in the soil with a potato root system growing and a beetroot growing on top, and a very beautiful brass toe.

That's a nice closeup of it.

Then another character was half female, half cheetah. A little homage to my life as an athlete.

It took 14 hours of prosthetic makeup to create a creature with articulated legs, claws and a gecko-like tail.

(Laughter) And the other leg that we co-created is this one. They look like jellyfish legs. It is also made of polyurethane.

And the only purpose these legs can serve, outside the context of a film, is to stimulate the senses and to inspire the imagination.

That's why quirkiness is important.

I now have more than a dozen pairs of prosthetic legs made for me by different people. The prosthesis can be used to vary the terrain under the foot and alter the height. I have 5 different height variables.

(Laughter) I'm 6 feet 1 inch tall today.

And I had these legs made a little over a year ago at Dorset Orthopedic in England, and when I brought them back to Manhattan, the first night I was out on the town, I went to a very fancy party.

And there was a girl there who had known me for years at my normal height of 5ft 8in.

When she saw me she opened her mouth wide and said, "But you're tall!"

And I said, "Okay. It's fun, isn't it?"

So it's like putting stilts on stilts, but I have a whole new relationship with door jams. This is something I never expected to have.

And I enjoyed it.

And she looked at me and said, "But Amy, that's unfair."

(Laughter.) (Applause.) And surprisingly, she really did.

It's unfair that you can freely change your height.

At that time, I learned that dialogue with society had changed dramatically in the last ten years.

It is no longer about overcoming scarcity.

It's about augmentation.

It's a conversation about possibilities.

A prosthetic leg no longer represents a need to compensate for the loss.

It symbolizes that the wearer has the power to create whatever they want in the space.

So people who were once considered disabled by society can now become architects of their own identities and actually continue to change their identities by designing their own bodies from a place of empowerment.

And what's really exciting to me now is that by combining cutting-edge technologies like robotics and bionics with age-old poetry, we're getting closer to understanding our collective humanity.

If we want to reach our full potential as human beings, I think we need to celebrate the heartbreaking strengths and glorious obstacles we all possess.

Reminds me of Shakespeare's Shylock. "If you stab us, we won't bleed, and if you tickle us, won't we laugh?"

It is our humanity and all the possibilities within it that make us beautiful.

thank you.

(applause)

In 1943, an Allied aircraft swooped down over Nazi Germany, raining tens of thousands of leaflets on the people below.

Written by an anonymous German, the flyer urged readers to abandon Hitler, fight furiously for the future, and never give up hope.

Their calls to action spread to homes and businesses, and news of their message reached concentration camps and prisons.

It was only after the war that the authors' identities, stories, and tragic destinies were revealed.

When Hitler came to power ten years ago, Hans and Sophie Scholl were teenagers living in the town of Forchtenberg.

At the time, fear, propaganda, and surveillance had brought every aspect of the lives of the Scholl family and millions of other Germans under Nazi control.

The government has set up institutions to specifically target young people and regulate their behavior and ideology.

As a teenager, Hans was a member of the Hitler Youth, and Sophie joined the German Girl's Federation.

Hans rose through the ranks and oversaw the training and indoctrination of other youths.

In 1936 he was chosen to bear the flag at a national rally.

But it wasn't until I saw the enthusiasm of the Nazi rhetoric that I began to question it.

Meanwhile, Sophie is also beginning to question the information she's been given.

Parents Robert and Magdalena, who feared losing their children to Nazi ideology, contributed to these fears.

At home, Robert and Magdalena listened to foreign radio stations that the government first encouraged and later banned.

As the government floods national television denial of Nazi atrocities, the Scholl family learns a shocking truth.

Yet they were still subject to Hitler's German rules of life.

After the outbreak of war, Sophie reluctantly worked for the national cause, and Hans had to undertake military duties while attending medical school in Munich.

There Hans met Christoph Probst, Willy Graf and Alexander Schmolell.

By the day, each grew weary of Nazi ideology.

They were anxious to share their opinion.

But how did they spread the information when they didn't know who to trust?

So the friends decided to revolt anonymously.

They pooled their money to buy printing materials.

An acquaintance let me use the basement under the studio.

They began writing draft messages in secret.

In June 1942, mysterious anti-Nazi villas began popping up all over Munich.

They signed "white roses".

The first leaflet denounced Hitler and called on the Germans to sabotage the war effort. “Employ passive resistance…before it is too late, before the last city is a heap of rubble…before the last youth of our country bleeds to death…stop this atheistic war machine from functioning…”

Remember, each citizen gets the government they deserve! Such language was unprecedented at a time when sarcastic remarks could amount to treason.

Written primarily by Hans Scholl.

In 1942 Sophie came to Munich not knowing anything about her brother's activities.

She soon came across the flyer at school.

But it wasn't until I found evidence in Han's room that I knew who wrote it.

Her shock quickly turned to resolution. she wanted to come in.

For the two brothers, it's time to intensify the anger that has been brewing for years.

From June 1942 to February 1943 the group worked hard.

While the Gestapo searched for clues, White Rose was always on guard.

The war intensified. Restrictions were tightened and Munich was hit by air raids.

But Whiterose has gone even further in intrigue.

They graffitied buildings and braved trains swarmed by the Gestapo.

In the winter of 1942, Hans made the perilous journey to the Czechoslovak border to meet with anti-Nazi rebels.

On February 18, 1943, Sophie and Hans brought a suitcase of leaflets to the university.

A caretaker who noticed their behavior notified the Gestapo.

They both calmly denied any involvement, but the police collected all the leaflets and put them back in the empty case, which fit snugly.

As soon as Hans and Sophie confessed, they were taken to court and sentenced to death by guillotine.

Despite severe interrogation, the two refused to betray their co-conspirators.

Before being executed, Sophie expressed her anger at the state of her homeland.

But she also spoke of a more hopeful future:

It's a very sunny day and I have to go, but what does my death mean if thousands of people wake up and take action through us? ”

It starts with a countdown.

On August 14, 1947, as the clock approached midnight, a Bombay woman went into labor.

Across India, people are waiting with bated breath for the declaration of independence after nearly two centuries of British occupation and rule.

And as midnight draws near, a wriggling infant and two new nations are born in perfect synchronicity.

These events form the basis of the wonderful novel The Midnight Children by British-Indian author Salman Rushdie.

A baby exactly the same age as the nation is the hero of the novel, Saleem Sinai.

His story spans over 30 years of his life, jumping back and forth through time to deduce family secrets and deep-seated mysteries.

These contain the greatest mysteries. That is, Saleem has magical powers, which are somehow related to the time of his birth.

And he's not the only one.

All children born around midnight are imbued with extraordinary powers. Like the witch Parvati who is a brilliant magician. and Salim's nemesis, Shiva, a talented warrior.

Saleem uses her telepathic powers to forge a connection with a vast network of Midnight Children, including figures who can travel through time and mirrors, children who change gender when submerged in water, and multilingual conjoined twins.

Saleem serves as a delightful guide to magical happenings and historical context.

His birthday is a day of celebration, but it also marks a turbulent period in Indian history.

In 1948, Indian independence movement leader Mahatma Gandhi was assassinated.

Independence also coincided with the partition of British-ruled India into two states, India and Pakistan.

This contributed to the outbreak of the Indo-Pakistani wars of 1965 and 1971.

Saleem touches on all this and more as he traces the founding of Bangladesh in 1971 and Indira Gandhi's emergency rule.

This vast historical framework is one reason why Midnight Children is considered one of the most brilliant works of postcolonial literature ever written.

The genre usually deals with the experiences of people living in colonized and formerly colonized countries, exploring their impact through themes such as revolution, migration and identity.

Born in 1947, like Saleem, Rushdie was educated in India and England and is known for his transcontinental history, political commentary, and magic realism.

He enriches Midnight's Children with a wealth of Indian and Pakistani culture, from family traditions to food, religion and folklore.

The story of Saleem, who scribbles night after night under the watchful eye of his lover Padma, recreates the story of the Thousand and One Nights, in which a woman named Scheherazade tells a series of tales to the king to keep her alive.

In Saleem's view, 1001 is "the number of nights, the number of magic, the number of alternate realities." Over the course of the novel, Rushdie surprises us with multiple versions of reality.

Sometimes this is like reading a roller coaster.

Salim says: My answer: I am all who have been affected by my existence in this world.

I am everything that will happen after I leave, and it wouldn't have happened if I hadn't come.

Nor am I particularly good at this. Each 'I', and each of the 600+ million of us now, contains many of the same.

Finally, I repeat, you have to swallow the world to understand me. ” There is often a breathtaking quality to Saleem’s stories. And I question the idea that history can be condensed into a single narrative, while Rushdie portrays the cosmological consequences of life.

His gripping plot and shape-shifting characters have garnered continued fascination and admiration.

Midnight's Children not only won the prestigious Man Booker Prize the year it was published, it was also voted best of all winners in a 2008 contest in which all 39 winners competed.

In a masterpiece of epic scale, Rushdie reveals that there is no single truth. Rather, it is wiser to believe in several versions of reality at once, hold many lives in the palm of your hand, and experience multiple moments in a single strike of the clock.

Identical twin astronauts celebrate their 20th birthday and volunteer for an experiment.

Terra remains on Earth while Stella boards a spaceship.

Stellar's ship travels at 86.6% of the speed of light, visits a star 10 light years away, and returns to Earth at the same speed.

As they prepare to part ways, the twins wonder what will happen when they meet again.

One light year is exactly the distance light can travel in one year, so Stella's journey should take 23 years.

But the twins have studied special relativity and know it's not that simple.

First of all, the faster an object moves through space, the slower time moves relative to a stationary observer.

This relationship can be quantified with something called the Lorentz factor defined by the following equation:

And second, the length of a moving object measured by a stationary observer shrinks by the same factor.

At 86.6% of the speed of light, the Lorenz coefficient is 2, meaning time flows twice as slow inside a spacecraft.

Of course, Stella doesn't notice the time slowing down.

That's because all time-based processes onboard, such as clocks and electrical devices, will slow down as well. Stella's biological activities include the speed of aging and the perception of time itself.

On Stellar, only an observer in an inertial or unaccelerated frame of reference, like Terra back on Earth, would be able to notice the slow passage of time on a moving spacecraft.

Terra therefore concludes that when they meet back on Earth, she will be older than Stella.

But that's just one way of looking at things.

Since all movement is relative, Stella argues that it is equally valid to say that her spacecraft is stationary while the rest of the universe, including Terra, moves around her.

In that case, time would slow down twice for Terra, and Stella would eventually become the older twin.

Neither can be older than the other. So which one is correct?

This apparent contradiction is known as the "twin paradox". But this isn't really a paradox, just an example of how the Special Theory of Relativity can be misunderstood.

To test their theory in real time, each twin agrees to send a burst of light to the other every year.

Unlike other objects, the speed of light is always constant regardless of the observer's frame of reference.

Light bursts transmitted from Earth are measured at the same speed as light bursts transmitted from spacecraft, regardless of the forward or backward journey.

So when one of the twins observes a burst of light, it measures how long it took the other twin to experience the passage of a year, and how long it took the light to travel between them.

You can track what is happening on the graph.

The X-axis shows distance from Earth and the Y-axis tracks time.

From Terra's point of view, her trajectory is a simple vertical line, with distance equal to zero, and each tick mark on the line corresponds to one year as she perceives it.

Stellar's path extends from the same origin to a point 11.5 years in time and 10 light-years away from Terra...then converges again at distance zero and 23 years in time.

After the first year, Terra sends a pulse of light from Earth towards Stella's spacecraft.

It takes one year for light to travel one light year, so the path is diagonal at 45 degrees.

And Stella is so far away from it that by the time the light catches up with her, a total of over 7 years for Terra and over 4 years for Stella.

By the time Stella observes Terra's second explosion, she will already be on her journey home.

But now that she's moving toward the light source, it takes less time to reach her, and you'll observe the bursts more often.

This means that while Stella observes a slowly aging Terra for the first half of her journey, she ages rapidly during the return half.

For Stella, on the other hand, it seems as though Terra, the destination star, and the entire universe are moving around her.

And because the length shrinks, Stella observes the distance between them doubling.

From Stella's point of view, this means that each leg of the journey takes only about six years.

Two years passed for Terra when she sent the first signal to Earth.

Stellar will send out four more bursts of light on its outbound journey, each from a distance.

By the time Terra observes the first pulse from Stella's outbound journey, more than 21 years have passed for her.

Until Stella returns home, Terra receives multiple bursts of light each year.

Thus, Terra observed that Stella aged slowly about 90% of the 23 years they were apart, and rapidly aged the last 10%.

This asymmetry explains why this paradox is not really a paradox.

Each of the twins witness time speed up or slow down for each other, while Stella sees it split evenly, while Terra sees Stella slowly aging during most of their time apart.

This is consistent with the twins' measured space voyages that each took 23 years on Earth, but experienced only 11.5 years on board.

Terra will be 43 and Stella 31 when the twins are reunited.

Where Stella was wrong was her assumption that she and Terra had equal rights to be inertial observers.

To be an inertial observer, you must maintain a constant speed and direction with respect to the rest of the universe.

Since Terra was stationary the entire time, her velocity was a constant zero.

But when Stella turned for her return trip, she entered a different frame of reference than when she left.

Both Terra and Stella now have a better understanding of how space-time works.

And being twins 11 years apart, they are a perfect example of special relativity.

The attacking infantry advanced steadily and their elephants had already broken through the defensive line.

The king attempts to retreat, but enemy cavalry sandwiches him from behind.

Escape is impossible.

But this is not a real war, nor is it just a game.

For nearly 1,500 years, chess has been known as a tool of military strategy, a metaphor for human affairs, and a standard of genius.

The earliest records of chess date back to the 7th century, but legend has it that the origins of the game go back a century.

Supposedly, when the youngest prince of the Gupta Empire died in battle, his younger brother devised a way to tell his grieving mother about the scene.

A new game set on the 8x8 Ashtapada board used for other popular pastimes has emerged with two key features. It has different rules for moving different kinds of pieces and one king piece where fate decides the outcome.

The game was originally known as Chaturanga, which means "four divisions" in Sanskrit.

However, its spread in Sassanid Persia gave it its current name and terminology. "Chess", derived from "sha", which means king, and "checkmate", derived from "sha mat" or "the king is powerless". Chess was introduced to the Arab world after the Muslim conquest of Persia in the 7th century.

Beyond its role as a tactical simulation, it ultimately became a rich source of poetic imagery.

Diplomats and courtiers used chess terms to describe political power.

The ruling caliph himself became an avid player.

And historian Al Masoudi considered the game to be a testament to human free will, compared to games of chance.

Medieval trade along the Silk Road brought the game to East and Southeast Asia, where many local variants developed.

In China, chess pieces were placed at the intersections of the grid rather than inside the grid as in the native strategy game Go.

The reign of the Mongol leader Tamerlane saw 11x10 boards with secure squares called citadels.

And in Japanese shogi, captured pieces could be used by the opposing player.

However, it was in Europe that chess began to take on its modern form.

By 1000 AD, games had become part of court education.

Chess was used as an allegory for different social classes in their proper roles, and the work was reinterpreted in new contexts.

At the same time, the church remained skeptical of the game.

Moralists warned against spending too much time playing chess, which was briefly banned in France.

However, the game proliferated, and in the 15th century it took shape as we know it today.

Perhaps inspired by the recent surge in strong female leaders, relatively weak advisors have been recast as stronger queens.

As this change accelerated the pace of the game and other rules prevailed, papers analyzing common openings and endgames emerged.

The theory of chess was born.

During the Age of Enlightenment, gaming moved from courts to coffee houses.

Chess is now seen as an expression of creativity, encouraging bold moves and dramatic play.

This "romantic" style culminated in 1851's Immortal Games, where Adolph Andersen succeeded in checkmating at the expense of the Queen and both rooks.

However, the advent of formal competitive play in the late 19th century meant that strategic calculation ultimately triumphed over dramatic talent.

And with increasing international competition, chess has taken on new geopolitical importance.

During the Cold War, the Soviet Union devoted enormous resources to developing chess talent and dominated the championship for the rest of the century.

But the player who would really upset Russia's supremacy was not the people of other countries, but an IBM computer called Deep Blue.

Computers to play chess have been in development for decades, but Deep Blue's victory over Garry Kasparov in 1997 was the first time a computer had defeated the incumbent champion.

Today, chess software can consistently beat the best human players.

But like the games they mastered, these machines are the product of human ingenuity.

And perhaps the same ingenuity will get us out of this obvious checkmate.

In the autumn morning of 55 B.C.E., as the sun was rising, Kamma placed two doves on the altar in the center of the village.

She prays to Matrona, Mother of the Earth, and to Lugus, chief of the gods.

She then decapitates the bird, cuts it open, and examines its internal organs to examine God's message.

Kama is a druid.

This means that she officiates religious ceremonies, but also acts as a judge, healer, and scholar, teaching children, and mediating disputes between Celtic tribes.

Druid knowledge was considered too sacred to be recorded in writing, so she began her studies as a child, memorizing the countless details required to play many roles.

Like many druids, she studied in England for many years.

She is now a druid of the Veneti tribe, living in a small farming village near the west coast of what is now Gaul, France.

Since returning to Gaul, she has received many marriage proposals, but at least for now she has decided to focus on her work.

The omens are nasty this morning.

They talk about wars and conflicts, as they have in the last few months.

Twice this autumn, the neighboring tribe, the Redones, raided villages in broad daylight and stole cattle.

Children gathered to see her work.

Comma plays the lyre and sings to them.

She weaves tales of the mighty kings who once ruled their lands - brave warriors who were slain naked in battle, but who, like all Celts, are reborn.

As the children go out to help in the fields, Kamma travels across the village to visit an old lady with an eye infection.

On my way to the old lady's hut, I passed men salting pigs for winter food and women weaving clothes from dyed wool.

She provides a remedy for her injured eye. It is made from mistletoe, a sacred healing plant, but can be deadly if used incorrectly.

From there, Comma visits the chieftain to discuss the omens.

She convinces him to discuss the matter with his neighbors.

Accompanied by several warriors, they travel through the forest and demand a meeting outside the walls of the village of Rednes.

A representative of Redones brings a druid recognized by Comma at an annual meeting in central Gaul where druid chieftains are elected.

The chiefs soon quarrel and start threatening each other.

Kama intervenes between opposing sides to stop the fight. They must respect her authority.

Finally, the Redon family agrees to pay Kamma's tribe for a few cows.

Despite this determination, Kama still feels uneasy on the long walk home.

A bright streak crosses the sky as they approach the walls of the village. This is also an omen, but what is it?

Upon returning home, Kama joins the elders for a dinner of porridge, some meat and a glass of wine.

An intercepted parchment arrived while they were out during the day.

Camma recognizes the write immediately.

Druids are forbidden to record their knowledge, but she and many other young druids can read Latin.

From the message she learned that the Romans were approaching their land.

Some of the elders say the tribe should flee and hide in the nearby hills, but Kamma believes in God and advises them to stay home.

In private, she has her doubts.

If the Romans reached them, she might have limited powers to help.

Unlike other Celtic tribes, the Roman legions did not consider the druids' divine role as peacemakers.

Before going to bed, she observes the paths of the planets and refers to charts to try to make sense of the meteor she saw earlier.

Their signs are converging into a threat greater than their neighbours.

Now let me give you an overview of the game.

If the New York Times put an article about play on the cover of its February 17 issue of its Sunday magazine, it must be serious.

At the bottom of this, it says, "Deeper than gender.

Seriously, but dangerously fun.

And it's a sandbox for new ideas about evolution. ”

Not bad, but when you look at the cover, what is it missing?

Can you see adults too?

Well, let's go back to the 15th century.

This is a European courtyard with a mix of 124 different games.

All ages, solo play, body play, games, taunts.

And there it is. I think this is a typical picture of what the courtyard looked like at that time.

I think we have lost something in our culture.

So here's what I think is an amazing sequence.

North of Churchill, Manitoba, the Hudson Bay is ice-free from October to November.

And this polar bear you're looking at, this 1200-pound male, he's wild and pretty hungry.

German photographer Norbert Rosing was also on site, taking a series of photos of the tethered huskies.

And from the left side of the stage emerges this wild male polar bear with a predatory gaze.

There should always be some kind of predatory gaze that anyone who's ever been to Africa or been chased by a dog in a dumpster knows he's in trouble.

But beyond that predatory gaze is a female husky, bowing and wagging her tail.

And then something very unusual happens.

It changes its fixed behavior—rigorous, stereotyped, and ending with eating.

And this polar bear is standing on a husky dog, claws not outstretched, fangs not pointing at you.

And they start a wonderful ballet.

The ballet of the play.

It exists in nature and negates its carnivorous nature, otherwise it would have ended in a short deadly fight.

And if you start to look closely at the huskies pressing their throats to the polar bears, and look a little closer, you'll see that they're in a strange state.

they are at play.

And it's that state that allows these two creatures to explore the possibilities.

They are starting to do things neither of them could have done without the cue to play.

And this is a great example of how power differences can be subverted by the natural processes within us all.

So how did I get involved in this?

John said I've done some work with killers and I have.

The Texas Tower Murderer, in retrospect, opened my eyes to the importance of play as we studied his tragic mass murder. Because that person was found to have severe play deprivation by in-depth research.

His name was Charles Whitman.

And our panel, made up of many hard scientists, certainly felt at the end of that study that the lack of play and the progressive suppression of developmentally normal play had made him more vulnerable to the tragedy he had perpetrated.

And the discovery has stood the test of time, and unfortunately even Virginia Tech is still making discoveries these days.

Other research on people at risk also made me sensitive to the importance of play, but I didn't quite understand what it was.

And it took me years to collect my personal play history, but it really started to come to the realization that I didn't quite understand it.

And I think some of us will never fully understand that.

But there is a point of view that I think can give us all a taxonomy, a way of thinking about it.

And this image is the starting point of play for humans.

What happens when mother and infant make eye contact and the infant is old enough to smile socially is a spontaneous outburst of joy on the part of the mother.

Then she starts babbling and cooing and so does the baby.

As we connect our brainwaves to them and entrain their right hemispheres, we are beginning to understand the joyful appearance of these early play scenes and their physiology.

And I want you to think that all the more complex play is built on this foundation of us humans.

So I'm going to give you a kind of perspective on play, but it's not a single one.

Here we look at body play, the spontaneous desire to escape gravity.

This is a mountain goat.

If you're having a bad day, give this a try. Jumping and twisting your body will make you feel better.

And you might feel like this character, too, doing it for himself.

No special purpose, that's the beauty of play.

If the purpose outweighs the act of doing it, it probably isn't play.

And then there's a completely different type of play. It's object play.

And this Japanese macaque is trying to make a snowball and roll down the hill.

And they don't throw it at each other, but this is a fundamental part of playfulness.

The human hand that manipulates objects is the hand that seeks the brain. The brain is looking for hands. And play is the medium that best combines the two.

JPL I heard this morning -- JPL is a great place.

They sought out two consultants, Frank Wilson and Nate Johnson. They are Frank Wilson a neurologist and Nate Johnson a mechanic.

He was teaching mechanics at a high school in Long Beach when he realized that his students could no longer solve their problems.

And he tried to understand why. And he came to the utterly dogmatic conclusion that students who couldn't solve problems like car repairs weren't working.

Frank Wilson was writing a book called "The Hand".

They got together -- JPL hired them.

JPL, NASA, Boeing, before hiring R&D problem solvers, even if they did well at Harvard or Caltech, if they had never fixed a car, hadn't worked or played with their hands early in life, they similarly couldn't solve problems.

Play is therefore hands-on and very important.

Now, one of the characteristics of play is that play is born out of curiosity and exploration. (Laughter) But it has to be a safe expedition.

This happens to be okay. He's an anatomically curious little boy, and that's his mother. Any other situation would not be so good.

But curiosity and exploration are part of play.

If you want to belong, you need social play.

And social play is part of what we're talking about here today, a byproduct of the play scene.

Rough and tumble play.

From a distance, these lionesses looked like they were fighting.

But if you look closely, they resemble polar bears and huskies. Clawless, flat fur, soft eyes, fangless open mouth, ballet-like movements, curvilinear movements, all characteristic of play.

And rough play is a great learning medium for all of us.

For example, preschoolers should be allowed to dive, spank, whistle, scream and confuse, and should develop through the many emotional control and many other social by-products (cognitive, emotional and physical) that occur as part of rough play.

Audience theater, ceremonial theater -- we are part of it.

If you're from Boston, you know this was a rare--a rare moment--when the Red Sox won the World Series.

But if you look at everyone's faces and body language in this ambiguous photo, you get the sense that they're all playing.

imaginative play.

I love this photo because my daughter, who is now almost 40, is in it, and it reminds me of her storytelling, her imagination, and her ability to spin yarn at this age, when she was in kindergarten.

What really matters as a player is imaginative solo play.

And I love this one, because it's ours too.

We all have our own inner story.

Most units of comprehension in our brain are stories.

Today we will talk about play.

Well, I think this Bushman is talking about a fish that has escaped for a long time, but that's a fundamental part of the play scene.

What effect does play have on the brain?

Well, there are many.

We don't know much about how play affects the human brain because so much money has not been invested in research on play.

I went to Carnegie University for a grant.

When I was a member, I thought they had a good track record, given the large grants they had given me to study felony drunk drivers, but by the time I finished talking about play for half an hour, it was clear they weren't—I didn't feel the play was taken seriously.

It was a few years ago, but I think that wave has passed and the wave of play is reaching its peak. Because we have good science.

Nothing activates the brain like play.

Three-dimensional play activates the cerebellum, provides more stimulation to the frontal lobe (executive part), and aids in the development of contextual memory. And then and then.

So, for me, it's been a very rewarding academic adventure to look at the play-related neuroscience and bring together people who wouldn't have thought of it that way in their respective fields.

And that's part of the purpose of the National Play Institute.

And this is one way to study play. 256-lead EEG acquisition.

It's a pity that it doesn't have a playful subject, but it allows for mobility, which limits the study of actual play.

And we have a mother-child play scenario that we want to complete now.

I put this here also to organize my thoughts on objectifying what play does.

The animal kingdom has objectified it.

In the animal world, rats are hardwired to play at certain stages of childhood, so when play is suppressed, they squeal, wrestle, and pin each other, which is part of their play.

If you stop the behavior in one group of experiments, allow the behavior in another group of experiments, and give the rats a cat-scented collar, the rats are programmed to run away or hide.

Pretty smart, they don't want cats to kill them.

So what happens?

They are both hiding.

Non-players never come out - they die.

Players slowly explore the environment and start testing things out again.

So, at least in rats, which I think have the same neurotransmitters and similar cortical structures as we do, play could be very important for our survival.

And, and, and there are many other animal studies that I would like to talk about.

Now, this is the result of play deprivation. (Laughter) This took a long time. I had to drop Homer off for an fMRI, SPECT, and multiple EEGs, but like a couch potato, his brain dwindled.

And we know that domestic animals and other animals, like mice, do not develop normal brains if they are deprived of play.

Now, the show says that the opposite of play is depression, not work.

When you think about life without play, there is no humor, no cheating, no movies, no games, no fantasy.

Imagine a culture and life without play, whether you are an adult or not.

And what makes our species so unique is that we are designed to play throughout our lives.

And we all have the ability to regenerate signals.

No one misses that dog I photographed on the beach in Carmel a few weeks ago.

Play is born out of action.

And you can trust it.

The basis of human trust is established by play signals.

And as we grow up, we begin to lose those signals, culturally or otherwise.

I'm sorry.

I think we have a lot to learn.

Well, Jane Goodall has a playful face here with one of her favorite chimpanzees.

So part of the play signaling system involves voice, face, body, and gestures.

As you know, I think it's very important when starting a group play that the group feels safe by sharing their own play signals.

You may not know this word, but this should be your biological surname.

This is because neoteny means retaining immature qualities into adulthood.

And according to physical anthropologists and many studies, we are the youngest, youngest, most flexible, most plastic of all living things.

Therefore, it is the most playful.

This makes it even more adaptable.

Now, there is another aspect of play that I would like to emphasize here, and that is play history.

Your own personal play history is unique and often not something we particularly consider.

This is a book written by a perfect player named Kevin Carroll.

Kevin Carroll was born in extremely poor circumstances. An alcoholic mother, an absentee father, a black man living in inner-city Philadelphia who had to take care of his younger brother.

When he looked out the window where he was locked up on the playground, he realized he felt something different.

And he followed it up.

And his life -- a life change from poverty and perhaps prison or death -- he became a linguist, a trainer for the 76ers, and now a motivational speaker.

And throughout his life he gives play as a transforming force.

Now there's another play history and I think it's ongoing.

Those of you who remember Al Gore's first term in office and his subsequent successful but unelected presidential run may remember that he was somewhat cranky and not quite his person, at least in public.

And looking at his profile, which is often seen in the press, it seems to me at least - from Shrink's point of view - that much of his life was programmed.

Summer was hard work in the Tennessee summer heat.

He shouldered the expectations of his Senator father and Washington, D.C.

And I think he certainly had the ability to play, and I kind of know about it, but I don't think he was as empowered as he is now to pay attention to his own passions and inner impulses. I think it's in all of us in our playing history.

So what I recommend doing on an individual level is to go back and explore the clearest, fun, and playful images you have of things like toys, birthdays, and holidays as far back as you can.

And from that feeling, start building how it connects to your life right now.

And you find that you may change jobs to gain more power through play. It happened to a lot of people when I let them do it.

Alternatively, prioritizing your attention can enrich your life.

Most of us work in groups, but the d.school, a design school at Stanford University, was able to bring our group together to create a course called "From Play to Innovation," thanks to David Kelley and the many visionaries who founded it.

And you'll find that this course explores a state of human play similar to the polar bear's husky state and the importance of play in creative thinking. “We explore play behavior, its development, and its biological underpinnings, and apply those principles through design thinking to foster innovation in the corporate world. Students then work with real-world partners on design projects that have broad application.”

This is our maiden voyage.

It's been about two and a half months, three months since I started, but it was really fun.

Our star student, this Labrador, taught many of us what play is. And there is a very old and dilapidated professor in charge there.

And Brendan Boyle, Rich Crandall -- and on the far right, who I think would collude with George Smoot over the Nobel Prize -- neuroscientist Stuart Thompson.

So Brendan and the rest of IDEO have sat aside to watch students practice the principles of play in the classroom.

And one of their projects was to find out what makes meetings boring and try to do something about it.

So what comes next is a student-produced film about exactly that.

Narrator: Flow is a phantom mental state in which a person is completely immersed in what they are doing.

Characterized by energetic focus, full involvement in the process of activity and a sense of success.

A key insight we've learned about meetings is that people pack one meeting after another, disrupting their lives for the day.

Meeting attendees never know when they'll return to tasks left at their desks.

But it doesn't have to be.

(music) The sage and many times hairy monks of this place called d.

Don't worry, you can take a break from the meeting and come back to me.

Because that meeting literally sits in your closet when you need it again.

wearable meeting.

Because when you put it on, you'll have everything you need to host fun, productive, and informative meetings at your fingertips.

But when you take it off, that's when the real action happens.

(music) (laughter) (applause) Stuart Brown: So I encourage you to take part in the difference between work and play, where instead of setting aside time to play, every minute, every hour, a place where life is infused with bodies, objects, social, fantasy, transformative kinds of play.

And I think I can live a better, more powerful life.

thank you.

(Applause) John Hockenberry: So what you're saying sounds to me like there might be some temptation on the part of people to go see your work. I think you've heard that somehow in my kind of popular psychology understanding of play, the way animals and humans deal with it is a kind of rehearsal for adult activity.

Your research seems to suggest that it is wildly wrong.

SB: Well, I don't think that's accurate. I think it's probably because animals taught us that.

If the cat stops playing, it can. We've all seen cats batting around things, but cats are just as good predators as they were when they weren't playing.

And just imagine a kid pretending to be King Kong or a race car driver or a firefighter, but not all of them end up being race car drivers or firefighters.

So there is a disconnect between preparing for the future, which is what most people feel comfortable thinking about play, and thinking about play as a separate biological entity.

And here, following animals for 4 or 5 years has made a huge difference from a clinician to my current perspective. In other words, play has a biological role, just like sleep and dreams.

And if you look at sleep and dreams biologically, animals sleep, dream, rehearse, and do other things that aid memory, and that's a very important part of sleep and dreams.

The next step in the evolution of mammals and creatures with extra neurons, like gods, would be to play.

And the fact that a polar bear and a husky, or a magpie and a bear, or you and me and a dog can cross and have that experience is set aside as something else.

And it is very important in brain learning and creation.

So it's not just something you do in your spare time.

JH: How do you maintain -- and I know you're part of the scientific research community, but like everyone else you need to justify your existence with grants and proposals -- how do you stop -- and some of the data you produce, the good science you say you produce, is tough to deal with.

How can you prevent the media's interpretation of your work and the scientific community's interpretation of your work's implications, such as Mozart's metaphors? "Oh, MRI shows play boosts your intelligence.

Now, let's get these kids together, put them in a pen, and let them play for months at a time. They will all become geniuses and go to Harvard. ”

How can you prevent people from doing that with the data you're developing?

SB: Well, I think the only way I can do that is by gathering advisors from practitioners who can establish states of play through improvisational play, clowning, and so on.

So people know it's there.

And you get other kinds of hard scientists, including an fMRI expert, Frank Wilson, and a neuroendocrinologist.

And getting them grouped together and focused on play, it's pretty hard not to take that seriously.

Unfortunately, not enough effort has been put into such serious consideration by the National Science Foundation, the National Institute of Mental Health, or any other agency.

I mean, I've never heard of anything like play-related cancer or heart disease.

Still, I think it's as fundamental to long-term survival as it is to learn the basics of sanitation.

JH: Thank you, Stuart Brown.

(applause)

Time flies.

It was actually almost 20 years ago that I wanted to reshape how we use information and how we work together, inventing the World Wide Web.

Twenty years later, I would like to ask for your help in creating a new framework at TED.

So, back in 1989, I wrote a memo proposing a global hypertext system.

No one really did anything.

But 18 months later -- this is how innovation happens -- 18 months later, my boss said I could kick the tires on the new computer I got and take it on the side as something of a play project.

So he gave me time to code it.

So I basically gave a rough idea of ​​what the HTML should look like. Hypertext Protocol, HTTP. It's the name of the concept of URL, that is, what started with HTTP.

I wrote the code and published it.

why did i do that

Well, it was basically frustration.

I was annoyed. I worked as a software engineer in this huge and very exciting lab, with people from all over the world.

They brought in all kinds of computers.

They had all sorts of different data formats, all sorts of all sorts of document systems.

So, in all that diversity, if you wanted to find a way to build something from what you explored, you had to connect to new machines, learn how to run new programs, and find the information you needed in new data formats.

And all of these were incompatible.

Very frustrating.

All my frustrations were against this unleashed potential.

In fact, all these discs contained documents.

So just imagining all of this as part of a larger virtual document system in the sky, say on the Internet, would make life a lot easier.

Well, once you have an idea like that, it sticks in your mind. Even if people didn't read your notes, in fact he did, which was discovered after his death, his copy.

“Vague, but evocative,” he wrote in pencil in the corner.

(Laughter) But in general it was difficult. It was really hard to describe what the web is like.

It's hard to explain to people today how difficult it was back then.

But when TED started, there was no web, so things like "click" didn't mean the same thing.

You can show someone a piece of hypertext, a page with a link, click the link, bing, and they'll see another hypertext page.

Not impressive.

You know, we've seen it -- we've got it in hypertext on the CD-ROM.

The hard part was getting them to imagine. So imagine that link could lead to just about any document imaginable.

Well, it was a very difficult leap for people.

Well, some people did.

Yes, it's hard to explain, but there was a grassroots movement.

And that's what makes it the most fun.

The most exciting thing is not the technology, not what people have done with it, but really the community, the spirit of all these people coming together and sending emails.

That's how I felt at the time.

Do you know? It's funny, but now I'm in the same situation again.

I more or less asked everyone to put their documents up. I said, "Could you put your document on this web?"

And you did.

thank you.

It was a lot of fun.

Because it turns out that what's happening on the web really surprises us, so this was very interesting.

It's far beyond what I imagined when I put together my first little website.

Now I would like you to publish the data on the web.

It turns out that there is still great potential.

People still have a lot of frustration because they don't get data on the web as data.

What do you mean by "data"? What is the difference between documents and data?

Now, the document you read, okay?

More or less you can read them and follow the links from there and that's it.

Data -- Computers allow us to do all sorts of things.

Has anyone been here or seen Hans Rosling talk?

One of the great TED Talks. Yes, many of you have seen it. One of the great TED Talks.

Hans made this presentation showing different countries in different colors. He shows income levels on one axis, shows infant mortality rates, and animates this over time.

In other words, he used this data to give a presentation that shattered many of the myths people held about the economies of the developing world.

He set up a few slides like this.

All the data was underground, but the data is brown, boxy and boring. That's how we think.

This is because data cannot be used naturally by itself. But in reality, data drives a huge amount of events that happen in our lives, and it happens because someone takes that data and does something with it.

In this case, Hans compiled the data he found from all sorts of UN websites, etc.

He combined it into something more interesting than the original and put it into this software. I think his son probably developed it himself and produced this wonderful presentation.

And Hans emphasized that "having a lot of data is really important."

And I was happy to see that at the party last night he was still very forceful about having a lot of data.

So now I just want you to think about two data being connected, or like him, six data being connected. I want to think about a world where everyone puts data on the web, and virtually every data imaginable is on the web and calls that linked data.

This technology is linked data and it's very simple.

There are three rules when you want to publish something on the web. First, not only do we use the HTTP name (that starts with "http:") for the document, but we also use it for the content of the document.

We use them for people, places, products and events.

All kinds of conceptual things have names that start with HTTP.

The second rule takes one of these HTTP names, searches for it, uses it to perform web operations, fetches data from the web using the HTTP protocol, and returns data in a standard format. This is useful data that someone might want to know about the object or event.

Who will be at the event? About them, where they were born, things like that.

So the second rule is to get back important information.

The third rule is that when I get that information, it doesn't just include someone's height and weight and when they were born, it also includes relationships.

Data are relationships.

Interestingly, the data are relationships.

This person was born in Berlin. Berlin is in Germany.

And, if there is a relationship, then whenever it expresses a relationship, the other thing it is related to is given one of the HTTP starting names.

So let's go ahead and look into that.

So I look up people. You can look up the city in which the person was born. That way you can find out what region it's in, what town it's in, population, etc.

So I can browse this stuff.

That's really it.

That's the linked data.

I wrote an article a few years ago titled "Linked Data" and shortly after that things started happening.

The idea of ​​linked data is to take a lot of boxes that Hans had and sprout a lot of things.

Not just other plants.

It's not just the roots that feed the plant. Each of those plants sees all the data, whatever it is, presentation, analysis, people looking for patterns in the data, and connects them. What's really important about data is that the more things you need to connect, the more powerful your data becomes.

So linked data.

The meme came out of there.

And soon, Chris Bizer of the Free University of Berlin, one of the first to publish something interesting, noticed Wikipedia. Wikipedia is an online encyclopedia containing many interesting documents.

Well, these documents have little squares and little boxes.

And most info boxes contain data.

So he wrote a program that takes data, extracts it from Wikipedia, and puts it into linked chunks of data on the web. We called it dbpedia.

Dbpedia is represented by the blue blob in the middle of this slide. If you actually go to Berlin and look it up, you'll find that there are other chunks of data that contain information about Berlin that are linked together.

So if you get data about Berlin from dbpedia, you get other data as well.

And what's interesting is that it's starting to grow.

Again, this is just grassroots talk, okay?

Think about your data for a moment.

In fact, data comes in so many different formats.

Think about the diversity of the web. Being able to publish all kinds of data on the web is very important.

Data is no different. We could talk about all kinds of data.

Government data, corporate data is very important. We can talk about all kinds of data: scientific data, personal data, weather data, data about events, data about talks, news.

I'm going to mention a few of them to give you an idea of ​​the diversity and how much potential is unlocked.

Let's start with government data.

In his speech, Barack Obama said that US government data would be made available on the Internet in an accessible format.

And I would like you to post it as link data.

It's important. why is that important?

Not only transparency, but yes, government transparency is important, but that data -- this is data from all government departments. Think about how much of that data is about life in America.

It's actually useful. It's worth it.

You can use it in your company.

When I was a kid, I used it to do my homework.

So we're talking about making places and running the world better by making this data available.

In fact, if you are responsible, i.e. if you know about data in the government sector, often these people find themselves with a strong temptation to keep it, which Hans calls a database hug.

You care about your database and don't want to let it go until you've created a beautiful website.

Well, I would rather suggest creating a beautiful website. Who can say not to create a beautiful website?

Create a beautiful website, but give us pure data first. I need data.

I want pure data.

OK, I need to ask for raw data.

I'll let you practice it, okay?

Can you say "live"?

AUDIENCE: Raw.

Tim Berners-Lee: Can you say "data"?

Audience: Data.

TBL: Can you say "now"?

Audience: Come on!

TBL: Ok, "raw data now"!

Audience: Get your raw data now!

Practice it. This is important. Because you don't know how many excuses people will come up with to hold on to your data and not give it to you, even though you pay for it as a taxpayer.

And it's not just America. it is all over the world.

Of course, it's not just governments, it's companies as well.

So I'd like to share some other thoughts about the data.

Here at TED, we are always mindful of the big challenges facing human society today: curing cancer, understanding the brain in Alzheimer's disease, understanding how to make the economy a little more stable, understanding how the world works.

The people who are trying to solve them, the scientists, have half-formed ideas in their heads and try to communicate them on the web.

However, much of humanity's knowledge at the moment is in databases, often stored in computers, and not really shared today.

In fact, I will only discuss one area. For example, research on Alzheimer's disease has a large amount of related data such as drug discovery. Because scientists in the field recognize this as a great way to get out of silos. They kept their genomics data in one database in one building and their protein data in another.

Now they've pasted it into the linked data so they can ask the kinds of questions you probably wouldn't ask and neither would I ask, but they would.

What proteins are involved in signal transduction and also associated with pyramidal neurons?

Well, you take a bite of it and type it into Google.

Of course, there is no page on the web that answers that question because no one has asked it before.

223,000 hits were generated with no usable results.

If you ask the linked data (which they are currently putting together) for 32 hits, each one is a protein with those properties and you can see.

As a scientist, the ability to ask these questions, indeed interdisciplinary questions, is a complete transformation.

It's very, very important.

Scientists are completely stuck at the moment. The power of data collected by other scientists is locked up and we need to unlock it in order to tackle these big questions.

If you go on like this, you'll think all the data comes from a huge institution and has nothing to do with you.

But it's not.

In fact, data permeates our lives.

You just log on to your favorite social networking site and say, "This is my friend."

Bing! relationship. data.

You said, "This photo is about this person." it's the data. data, data, data.

Every time you do something on a social networking site, the social networking site retrieves and uses your data and reuses it to make life more interesting for other people on the site.

But suppose you visit another linked data site and this is about travel. If you say, "I want to send this picture to everyone in that group," you can't climb over the wall.

The Economist has written an article about it and many people have blogged about it, but this is a very big complaint.

The way to break down silos is to enable interoperability between social networking sites.

You need to do that with linked data.

Finally, let's talk about one more kind of data. This is probably the most interesting one.

I looked it up on OpenStreetMap before coming here. OpenStreetMap is a map, but it's also a wiki.

If you zoom in, that square thing is a theater - where we are now - the Terrace Theater. It didn't have a name.

So I was able to go into edit mode, select the theater, add a name to the bottom, and save it back.

Now go back to OpenStreetMap. If you find this place on org, you'll see that Terrace Theater has a name.

i did it myself!

I did it on the map. I just did it!

put it there. hey what do you know?

If I -- that street map is that everyone is doing their part, and everyone else is doing their part, it creates an incredible resource.

That's what linked data is all about.

People do what they can to produce little by little, and it all comes together.

This is how linked data works.

you do what you can Everyone else does their own thing.

I may not have a lot of data to put there myself, but I know I need to ask for it.

And we have practiced it.

So the linked data is huge.

I have only told you part of it. Data is in every aspect of our lives, in every aspect of our work and entertainment. It's important to connect the data, not just the number of places it comes from.

Connecting data gives you power in ways that the web and documents alone don't.

You really get a lot of power out of it.

So we're now at the point where we have to do this - people who think it's a great idea.

And I think all the people, and at TED, there's a lot of people who do something. The reason is that even if the investment doesn't pay off immediately, it will only really pay off when others do it. They do it because they are just people who do what other people should do.

OK, it's called linked data.

I wish you success.

request it.

And I think it's an idea worth spreading.

thank you.

(applause)

[This talk contains mature content] Five years ago, I received a phone call that changed my life.

I remember that day very vividly.

This time this year I was sitting in my office.

I remember the sun shining through the window.

and my phone rang.

And when I picked it up, it was two federal agents asking me to help them identify a girl in hundreds of child sexual abuse images they found online.

They had just begun investigating the case, but what they knew was that her abuse had been broadcast around the world for years on a dark website dedicated to child sexual abuse.

And while her abuser was incredibly technically sophisticated, with new images and new videos coming out every few weeks, there were few clues as to who she was or where she had been.

And they called us. Because we had heard that we were a new non-profit building technology to combat child sexual abuse.

But we were only two years old and we were only working on child sex trafficking.

And we had to tell them we didn't have any.

There was nothing we could do to help them stop this abuse.

It took another year before agents finally found the child.

And by the time she was rescued, hundreds of images and videos documenting her rape had spread rapidly across the dark web, peer-to-peer networks, private chat rooms, and the websites you and I use every day.

And today, as she struggles to get back on her feet, she lives with the fact that thousands of people around the world continue to watch her abuse.

Over the past five years, I have come to realize that this case is nothing special.

How did we arrive at this society?

By the late 1980s, child pornography, or child sexual abuse content, was largely eliminated.

New laws and increased prosecution have made it very dangerous to do business by mail.

Then came the internet and the market exploded.

The amount of content in circulation today is enormous and continues to grow.

This is a truly global problem, but let's look specifically at the United States. Last year, in the United States alone, more than 45 million child sexual abuse images and videos were reported to the National Center for Exploitation of Missing Children. This is almost double from the previous year.

And the details behind those numbers are hard to ponder, with over 60 percent of the images featuring children under the age of 12, most of which involve extreme sexual violence.

Abusers are cheered on in chat rooms dedicated to child abuse, gaining status and notoriety with more abuse and more victims.

In this market, the currency is the content itself.

While it is clear that abusers are ready to take advantage of new technologies, our response as a society has not.

These abusers don't read the website's user agreement and the content doesn't respect geographic boundaries.

And if we look at the puzzle one piece at a time, they win. That is exactly how our response today is designed.

Law enforcement functions within a single jurisdiction.

Companies only focus on their platform.

And the data learned along the way is rarely shared.

It's clear that this decoupled approach isn't working.

We must redesign our response to this epidemic for the digital age.

And that's exactly what we do at Thorn.

We connect these dots and build technology that gives law enforcement, NGOs, businesses and everyone on the front lines the tools they need to finally remove child sexual abuse content from the internet.

Let's talk -- (Applause) Thank you.

(Applause.) Let's talk a little bit about what these points are.

As you can imagine, this content is terrifying.

I don't want to see it if I don't have to.

So most businesses and law enforcement with this content can convert every file into a unique string of numbers.

This is called a "hash".

This is basically a fingerprint for each file or each video.

This allows that information to be used in investigations or allows companies to remove content from their platforms without having to review every image or video every time.

But the problem today is that these hashes reside in the hundreds of millions in siled databases around the world.

Siled it might work for one agency that can control the data, but the disconnect of this data means you don't know how much unique data you have.

It is not known which children have already been rescued or which children still need to be identified.

So the first and most basic assumption is that all this data should be connected.

There are two ways that combining this data with global software can have a transformative impact on the field.

The first is cooperation with law enforcement agencies. Help us identify new victims more quickly, stop abuse, and stop the creators of this content.

The second is companies. Use it as a clue to identify the hundreds of millions of files currently in circulation, delete them and stop uploading new material before the virus spreads.

Four years ago, when that incident ended, our team sat there and just felt like, uh...

...a deep frustration, that's how I can describe it. Because we watched the whole year while they were looking for her.

And we saw everywhere in the investigation that technology could have found her sooner.

So we got out of there and did the only way we knew how and started building software.

So we started with law enforcement.

Our dream was to put a warning bell on the desks of cops around the world so that if anyone dared post a new victim online, someone would immediately start looking for them.

We can't talk about the details of the software, of course, but it's now in use in 38 countries and has cut delivery times to children by over 65 percent.

(Applause.) And now we're embarking on that second horizon. The idea is to build software that allows companies to identify and remove this content.

Let's talk a little bit about these companies.

So I told you - last year there were 45 million images and videos in the US alone.

They are from just 12 companies.

12 companies, 45 million files of child sexual abuse material.

They are provided by companies that have the funds to build the infrastructure necessary to remove this content.

But there are hundreds of other companies, small businesses around the world, that need to make this effort, but they either 1) can't imagine their platform being abused, or 2) don't have the money to spend on not making a profit.

So we proceeded to build for them. The system gets smarter as more companies join.

Let's take an example.

Our First Partner, Imgur -- For those of you who haven't heard of this company, it's one of the most visited websites in the United States. Millions of user-generated content are uploaded every day on a mission to make the internet a more enjoyable place.

They partnered with us first.

Within 20 minutes of our system going live, someone tried to upload known bad behavior content.

They were able to stop it, remove it, and report it to the National Exploitation Center for Missing Children.

But they went one step further and investigated the uploader's account.

There are hundreds more of child sexual abuse material that we have never seen.

And this is where we start to see exponential effects.

We pull that material down and report it to the National Center for Exploitation of Missing Children, after which those hashes are put back into the system to benefit every other company on the system.

And if the millions of hashes that we have lead to millions more, and companies around the world identify and remove this content in real time, the speed of removing child sexual abuse material from the global internet will increase dramatically.

(Applause.) But this is why it has to be a scale issue, not just a software and data issue.

It will take thousands of police officers and hundreds of businesses around the world to enable technology to drive away perpetrators and dismantle the communities that perpetuate child sexual abuse around the world today.

And now is the time to do it.

We are no longer ignorant of the impact this is having on our children.

The first generation of abused children are now young.

The Canadian Center for Child Protection just conducted a recent study of these young people to understand the unique trauma of recovering from the abuse they know continues.

80% of these young people have considered suicide.

More than 60% have attempted suicide.

And most of them live in daily fear that they might see their abuse as they walk down the street, interview for a job, go to school, or meet someone online.

And reality has become reality for more than 30 percent of them.

They were identified by their online abuse.

This is not easy, but it is possible.

From now on, we need the will of our society to look at what is really hard to see, to bring something out of the darkness, and to let our children have a say. The willingness of companies to take action and ensure that their platforms are not complicit in child abuse. The government's willingness to invest in law enforcement to get the tools needed to investigate digital-first crimes, even when victims can't speak for themselves.

This bold initiative is part of that will.

It is a declaration of war against one of mankind's darkest evils.

But what I'm sticking with is that this is really an investment in a future where all kids can just be kids.

thank you.

(applause)

I travel around the world giving lectures on Darwin, and most of the time I talk about the strange reversal of Darwin's reasoning.

Now, that title, that phrase, comes from a critic, an early critic, and this is a passage that I love and would love for you to read.

“In the theory we have to deal with, absolute ignorance is the craftsmanship, so we can declare, as a fundamental principle of the whole system, that in order to make a perfect and beautiful machine, you don't need to know how to make it.

A careful examination of this proposition reveals that it expresses in a condensed form the essential idea of ​​the theory, and expresses in a few words all that Mr. Darwin meant. By a strange inversion of logic, he seems to think that absolute ignorance qualifies to supersede absolute wisdom in the achievement of creative skill. ”

that's right. that's right. And it's a strange reversal.

The creationist pamphlet has this wonderful page: "Test 2: Do you know any buildings without builders? Yes/No.

Do you know paintings without painters? Yes/No.

Do you know a car without a manufacturer?Yes/No.

If you answered 'yes' to any of the above, please provide more details. ”

ah! So this is some really weird inversion logic.

You would think that design requires an intelligent designer.

But Darwin showed that it was just a mistake.

But today I will tell you about another strange reversal of Darwin. This is equally puzzling at first, but in some ways just as important.

No wonder we love chocolate cake because it's sweet.

Guys like girls like this because they are sexy.

We love babies because they are so cute.

And of course we enjoy jokes because they are funny.

This is all inside out. that's right. And Darwin shows us why.

Let's start with something sweet. Our sweet tooth is basically an evolved sugar detector. Because sugar is high energy and, very broadly, it's only tied to taste. That's why we like sugar.

Honey isn't sweet because we like it, we don't like it because it's sweet.

There is nothing inherently sweet in honey.

If you look at glucose molecules until you're blind, you'll never know why they're sweet.

To understand why it's sweet, we have to look into our brains.

So if you think there was sweetness first and then we evolved to like it, it's the other way around. it's just wrong. it's the other way around.

Sweetness was born with evolved wiring.

And there's nothing inherently sexy about these young women.

And it's good that it doesn't exist. If it existed, Mother Nature would be in trouble. How do you get chimpanzees to mate?

Now you might think, oh, there is a solution, it's a hallucination.

That's one way, but there's a quicker way.

Just wire it up the way the chimpanzees like the look and apparently they like it.

That's all you need.

For six million years, we and chimpanzees have evolved in different ways.

Oddly enough, we ended up with bald bodies. For some reason they didn't.

Otherwise, this is probably the height of sexiness.

Our sweet tooth is an evolved, instinctive preference for high-energy foods.

Not designed for chocolate cake.

Chocolate cake is a paranormal stimulus.

The term comes from Niko Tinbergen, who conducted a famous experiment with seagulls. He found that the seagull had an orange spot on its beak. If you make the orange spot bigger, the chicks will peck it harder.

It was very exciting for them and they loved it.

Chocolate cake, for example, tells us that it is a paranormal stimulus for fine-tuning the wiring of a design.

And there are plenty of paranormal stimuli as well. Chocolate cake is one of them.

There are plenty of paranormal stimuli for sexiness.

And cuteness even has paranormal stimulation. This is a very good example.

It's important to love your baby and not be disappointed when you see dirty diapers, for example.

So babies need to attract our affection and nurturing, and they do.

By the way, a recent study found that mothers like the smell of their babies' dirty diapers.

So nature works here on different levels.

But now, if the baby wasn't what it was - if it was what it was, we'd think it was lovely to us, it would be attractive to us - we'd think, oh my God, would we want to hug it?

This is a strange reversal phenomenon.

Finally, what's the funniest thing? My answer is it's the same story, same story.

This is difficult and not obvious. That's why I'll leave it until the end.

And I can't say too much about that.

But we have to think evolutionarily. We have to think that the hard work that has to be done – it is the dirty work and someone has to do it – is very important to give us such powerful and built-in rewards when we succeed.

Well, I think I and a few colleagues have found the answer.

This is a neural system designed to reward the brain for doing dirty paperwork.

The bumper sticker on this view indicates that this is a debugging pleasure.

I don't have time to go into all the details, but I will say that only some kinds of debugging pay off.

And what we're doing is we're using humor as a kind of neuroscientific investigation, by turning the humor on and off, turning the joke knob - now it's not funny... oh, now it's funny...

Okay, let's change things up a bit... this is not fun. In this way we can actually learn something about the structure of the brain, the functional structure of the brain.

Matthew Hurley is the original author of this book. We call it a Harley model.

He's a computer scientist, Reginald Adams is a psychologist, and I'm there, and we're putting this together in a book.

thank you very much.

I'm an astrophysicist.

I study stellar explosions in space.

But I have a flaw: I'm restless and I get bored easily.

As an astrophysicist, I have an amazing opportunity to study the entire universe, but the thought of doing just that all the time makes me feel caged and limited.

But what if my problems with maintaining attention and getting bored weren't a drawback?

What if we could turn them into assets?

Astrophysicists cannot touch or interact with what they are studying.

There is no way to explode a star in a laboratory and figure out why or how it exploded.

Only blank photos and videos.

Everything we know about the universe, from the origin of spacetime in the Big Bang, to the formation and evolution of stars and galaxies, to the structure of our solar system, has come from studying images of the sky.

And to study systems as complex as the entire universe, astrophysicists are experts at extracting simple models and solutions from large, complex datasets.

So what else can you do with this expertise?

What if the camera was pointed at me?

At Urban Observatory, that's exactly what we do.

My husband, astrophysicist Greg Dobler, founded the first urban observatory at New York University in 2013, and I joined in 2015.

Here are some of the things we do.

We take pictures of the city at night and study the star-like city lights.

Studying how light changes over time and the color of celestial light provides insight into the nature of exploding stars.

By studying urban lighting in the same way, we can measure and predict how much energy cities require and consume, helping us build resilient power grids that support the needs of growing urban environments.

Daytime images capture plumes of pollution.

75% of New York City's greenhouse gases come from such buildings burning oil as a heat source.

Air quality sensors can be used to measure pollution.

But imagine putting sensors in each building in New York City and reading data from one million monitors.

Imagine the cost.

We worked with a team of students from New York University to build a mathematical model, a neural network that can detect and track volcanic plumes over the New York City skyline.

We can categorize them - harmless vapor plumes, white and ephemeral. Dark and persistent polluting chimneys. Provides policy makers with a map of neighborhood contamination.

This cross-cutting project produced an innovative solution.

However, the data analysis techniques used in astrophysics can be applied to all kinds of data, not just images.

We have been asked to help the California District Attorney understand prosecutorial delays in their jurisdiction.

Some are on probation or in prison, sometimes for years awaiting trial.

They wanted to know what kinds of cases were lingering and had a huge data set to research to make sense of it, but the office didn't have the expertise or equipment to do it.

That's where we come in.

Working with my colleague, public policy professor Angela Hawken, our team first created a visual dashboard to help prosecutors see and better understand the prosecution process.

But we also analyzed their data ourselves to see if the duration of the process was affected by social inequalities within their jurisdiction.

We did this using a method I used to classify thousands of star explosions and applied to thousands of trials.

In doing so, we have built a model that can be applied to other jurisdictions looking to investigate bias.

Collaborations between experts in these fields and astrophysicists have produced innovative solutions that improve people's quality of life.

But it's a two-way street.

I bring my background in astrophysics to urban science and bring what I learned in urban science back to astrophysics.

Echoes of Light: Reflections of star explosions in interstellar dust.

In our image, these reflections appear as white, fleeting, moving features, just like plumes.

I am adapting the same model for plume detection in city images to detect light echoes in sky images.

By exploring what interests and excites me and reaching outside my realm, I have turned my restlessness into an asset.

We and you all have unique perspectives that can generate new insights and lead to new, unexpected and innovative solutions.

thank you.

(applause)

Our decisions as fashion designers have the power to change our culture.

We choose who to cast for runway shows and campaigns, and ultimately who is admired and considered beautiful, and who is not.

Having this platform is a responsibility.

Something that can be used to exclude people or to empower others.

Growing up, I was obsessed with fashion.

I perused all kinds of fashion magazines at my local Barnes & Noble.

Being fashionable meant being tall, skinny, and having long, shiny hair.

That was my ideal, and it was reinforced everywhere I looked.

And to be honest, it still is.

I stopped eating because I wanted to look like a model.

It was a dark period in my life. My eating disorder has drained me.

All I was thinking about was counting every calorie and getting up early every day before school so I could run a few miles.

It took me many years to finally break free from the control my eating disorder had over my life.

But once it did, it freed up a lot of brain space to think about what I was really passionate about.

For a long time, the fashion industry has worked hard to set a beauty ideal that celebrates thin, young, white, cisgender and able-bodied models as ideals.

You can't help but be exposed to images of models photoshopped to the point where you can't see a single pore, fat roll or stretch mark.

No need to search hard to find an example.

This definition of beauty is harmful, dangerous and destructive, and we need to detonate it immediately.

(Applause) I hope you agree with me.

(Laughter) One of the worst things I've noticed in the last few years is that my eating disorder experience is not unusual.

In fact, it's a given.

I think there are studies that show that 91 percent of women, and probably all women who identify with their gender, are dissatisfied with the way they look.

It is inexcusable that we live in a society where it is expected that it is normal or the norm for teens to grow up hating themselves.

We have been fighting for fat acceptance and female body autonomy since the 60s.

and moved forward.

There are plus-size models like Ashley Graham and musicians like Lizzo who are breaking into the mainstream with body-positive messages.

thank god.

(Laughter) Brands like Area release campaigns without any Photoshop retouching.

But we are still filled with unrealistic expectations.

I love these words from Lizzo. “Body positivity exists only because body negativity is the norm.”

So how can we change the prejudice against looking different or not fitting into this narrow definition of beauty?

I believe it is through a bold and unapologetic celebration of beauty in all its many forms.

However, many fashion designers continue to reinforce this narrow definition of beauty.

From the way they're taught in school and in the real world, they drape mannequins that are only a size 4, or sketch on highly stretched and anatomically disproportionate bodies.

The design process does not take bodies of different sizes into account.

they are not considered.

So who are these designers designing for?

But the debate over exclusivity in fashion doesn't start and end with size.

It's about seeing people of different gender expressions, different ability levels, different ages, different races and ethnicities celebrate their own unique beauty.

In my own work as a fashion designer, I created a brand called Chromat. We are committed to empowering women, femmes and non-binary #ChromatBABES of all shapes and sizes through form-fitting clothing.

Swimsuits are a big focus for me. The reason is that this one piece of clothing has a huge impact on how people feel about themselves.

We wanted to create clothing with anxiety, with a focus on celebrating all body types.

On our runway you'll see the curves, cellulite and scars we wear proudly.

Yes, we are a runway show, but we are also a celebration.

I didn't start designing 10 years ago with a mission to change an entire industry.

But the models we cast at the time, who happened to be friends of mine who begged to be on my show, were so radical to some people, and unfortunately still different and weird to some people, that it was a big part of what we were known for.

But inclusiveness is not just superficial.

Equally important is who makes the decisions behind the scenes, from photographers to casting directors to interns.

Including diverse decision makers in the process is essential, and working with different communities is always better than trying to represent them.

And this is a key piece of the puzzle that many young designers may not even think about when they are just starting out in their careers: hire a plus-size or transgender photographer, or a woman of color as a casting director, or hire a black makeup artist. Fatima Thomas knows how important it is to be able to accommodate all skin tones. This is essential to creating a comprehensively comprehensive work like this one.

As swimmers and fashion designers, we wanted to rewrite the rules about the bikini body.

So we assembled a team of baby guards to enforce our guidelines for participation and acceptance in the pool.

Instead of "no diving" and "no running", what about "celebrate cellulite", "no body policing" and "no intolerance"?

And this was enforced by Baby Guard's Mama Cax, Denise Bidot, Gina Rocero, Erica Hart, Emme, and others, all of whom are their own activists.

I always felt it was important to show different body types in runway shows and campaigns.

In practice, however, it is only recently that we have been able to significantly expand our size range.

We launched our first Curb collection five years ago. we were so excited.

However, when I tried to launch it, it failed.

nobody was interested.

Our department store did not have more than the large size in stock. If there was stock, it was in a completely different location in the building.

In fact, one time our sales team said,

But when buyers come to see the collections they put on the market, they want their dreams to be sold and they want to see what they adore. ”

Our model implies that it was not.

However, I realized that it was much more important to expose this dream to more people.

We want consumers to know that it's their clothes that need to change, not their bodies.

(Applause.) We need more fashion choices in every size, in every retailer.

So finally in 2018, Nordstrom actually placed up to three times as many orders.

And having a major retailer invest in adding these units was a game changer for us. Then we can go to the factory. Now it goes up to 4X, which is about size 32.

This investment allowed us to change and realign our entire design process.

Various body sizes were provided for sketching and draping in the studio.

And the more fashion schools teach these skills, the more designers will be able to design for all body types.

(Applause.) So it's our job as fashion designers to leverage our platform to explode this narrowly confined definition of beauty.

My goal is that one day, growing teenagers won't feel the same peer pressure that I do.

And we hope that our work will contribute to opening up the fashion industry to celebrate different identities.

thank you.

(applause and cheers)

[This is an impromptu talk (and intro) based on a topic suggested by the audience.

The speaker does not know the content of the slides. Moderator: The next speaker -- (laughter) is -- incredibly -- (laughter) a very experienced linguist who works with a small group of researchers in a lab at the Massachusetts Institute of Technology. I accidentally discovered the secret of human intimacy by studying our language and how we communicate with other people.

I will share his views here. Anthony Veneziale, welcome to the stage.

(Applause) (Laughter) Anthony Beneziale: You might think I know what you're going through.

You may be looking at me at the red dot here, or you may be looking at me on screen.

There is a delay of 1/6th of a second.

did i catch myself? Hooray.

I was able to see myself before turning around, but that slight delay created a bit of a chasm.

(Laughter.) And the divide is exactly what happens with human language and the processing of that language.

Of course, I work in a small lab at MIT.

(Laughter) And we're striving for every insight we can get.

(Laughter) This isn't often associated with computational challenges, but in this case, it turns out that visual persistence and auditory uptake have a lot more in common than we previously realized. You can see it on this first slide.

(Laughter) (Applause) It quickly becomes a process of, "Is that a boiled egg?"

(Laughter) "Maybe it means that the egg's structural integrity can withstand the weight of what looks like a rock?

Oh is it really real stone? ”

Visual information makes us question.

But when I hear the information, something like this happens.

(laughter) The floodgates of our hearts open like the streets of Shanghai.

(Applause.) There's a lot of information to process, ideas, concepts, emotions, and, of course, vulnerabilities you don't want to share too much.

And we hide, hide behind what we like to call the floodgates of intimacy.

(Laughter.) And what's stuck in that floodgate?

What is the embankment built on it?

First of all -- (laughter) we found six different genotypes.

(Applause.) And, of course, we can begin to classify these genotypes into neuronormative and neurodiverse experiences.

(laughter) On the right side of the screen, you'll see spikes of neurodiverse thoughts.

Now, the neurodiverse brain can usually only tabulate and count two emotional states at any given time, thus ruling out the possibility of emotionally and possibly attuned to the current situation.

But on the left side is the neuronormative brain, which can often process about five different emotional-cognitive information at any one time.

These are subtle differences seen at the 75th, 90th, and 60th percentiles, and of course dramatic differences at the 25th, 40th, and 35th percentiles.

(Laughter) But of course, what are the neural networks that are helping to bridge and build these various contradictions?

(laughs) Scary.

(Laughter) (Applause) And as you all know, fear resides in the amygdala, and it's a very natural response, very closely related to visual perception.

Because it is less closely related to verbal perception, our fear receptors often fail before our cognitive use of language, words, and verbal cues.

So when we witness these moments of terror, we are understandably startled.

We stumble in certain directions and generally shy away from intimacy.

(Laughter) Of course, there are differences between men's perceptions and women's perceptions, and differences between transgender people and people in between, and people outside the gender range.

(Laughter) But fear is the core underpinning of all our response systems.

Some say that fight-or-flight is one of the earliest reptilian responses to our environment.

How can we detach or untie ourselves from the corners of the amygdala?

(Laughs) Well, I would like to tell you the secret now.

(Applause.) This makes a lot of sense.

(Laughter) The trick is in turning your back to each other, which may sound quite the opposite of what you were expecting, but turning your back to your partner in a relationship and putting your back on their back eliminates any visual cues.

(Laughter) (Applause) You can more easily accept failing first, and failing first -- (Laughter) much more important than the effort we put in to appeal to others, our partners, and ourselves.

We spend billions of dollars on the latest trends in clothing, makeup, and eyewear, but what we don't spend money and time on is connecting with each other in ways that are true, honest, and stripped of our visual receptors.

(Applause) (Laughter) Sounds difficult.

(Laughter) But we want to be proactive about this.

It's not just sitting on the sofa.

As one historian said today, sometimes it's important to get up and get around the couch.

And how can we do that?

Yes, ice is a big part of that.

Insight, Compassion, Empathy: I, C, E.

(Applause.) And when we start using this ice method, the possibilities are much greater than we are.

In fact they are smaller than you.

At the molecular level, I believe that insight is the unifying theme of every talk you've seen at TED. Of course, we believe that death is inevitable, as we see it as we embark on this journey here on this little planet, on ledges and cliffs.

(Laughter) I think that's the variable we're asking whether we can all meet at the same time.

(Laughter) When you use the ice and when we lean on each other's backs and build together and leave the fear behind and work towards it, I think that timeline gets a little longer. (laughs) They edit this part. (Laughter) Truth-based mature experiences of love, compassion, and intimacy that you share with your mind's eye and heart, that we can all touch and feel, and perhaps have potentially mushy experiences, and don't just throw them away because they're brown, but let's cut the experiences we've gathered in half and sow what's the heart, the core, the seed of that idea in each of us, and share it back-to-back.

thank you very much.

(applause)

Today I want to talk a little bit about predictable irrationality.

And my fascination with irrational behavior began many years ago in a hospital.

I suffered very bad burns.

And if you spend a lot of time in the hospital, you will see different kinds of irrationality.

And what particularly bothered me in the burn department was the process of the nurse removing my bandage.

Now, I'm sure you've removed a Band-Aid at least once, but you've probably wondered what the right approach is.

Quick removal (shorter but more intense) or slowly removing the Band-Aid (longer but less painful every second), which is the right approach?

The nurses in my department thought the right approach was to tear, so grab and tear, grab and tear.

It took about an hour because 70% of my body was burned.

And as you can imagine, I hated moments when it ripped with unbelievable intensity.

And I persuaded them, "Why don't you try something else?"

Why not take a little more time, say two hours instead of an hour, and reduce the intensity of this?"

And the nurse told me two things.

They told me they had the right model for the patient, meaning they knew what to do to minimize my pain. He also said that the word patient does not imply suggesting or interfering.

By the way, this is not only Hebrew.

It's done in every language I've ever experienced.

And, you know, it was no big deal. There wasn't much I could do. And they kept doing what they were doing.

And after about three years, I left the hospital and started studying at the university.

And one of the most interesting lessons I learned was that there is an experimental way that if you have a question, you can create a replica of that question in an abstract way. Then maybe we can look into this question and maybe learn something about the world.

that's what i did.

I was still intrigued by this question of how to unbandage a burn patient.

So I didn't have much money to begin with, so I went to a home center and bought a carpenter's vise.

And then I took people into the lab and put their fingers in it and chewed it up a bit.

(Laughter.) And I chewed it long and short, and pains up and pains down, with breaks and without breaks, all kinds of versions of pain.

And when I was done hurting people a little bit, I asked them, so how much did this hurt? Or how painful would this have been?

Or if you had to choose between the last two, which would you choose?

(Laughter) I kept doing this for a while.

(Laughter) And, like all good academic projects, we got more funding.

I even have a pain suit that can transition to sound and electric shocks and make people feel even more pain.

But what I learned at the end of this process was that the nurse was wrong.

There were great people here with good intentions and a lot of experience, but despite that, they always predictably got things wrong.

Because we didn't encode duration in the same way that we encoded intensity, we found that longer durations and lower intensities were less painful.

In the end, it turned out that it was better to start with the face, which was more painful, and move towards the legs, which tended to improve over time. Then it would be less painful.

I also found that it was better to take a break in the middle to ease the pain.

All these things were great, but the nurses had no idea.

And from that point on, I wondered if it was only nurses in the world who were wrong in this particular decision, or if it was a more general case.

And it turns out that this is the more common case. There are many mistakes we make.

I would like to give one example of these absurdities and talk about cheating.

And the reason I chose cheating is because it's interesting, but at the same time, I think it tells us something about the stock market situation that we're in.

So my interest in cheating started when Enron came on and suddenly exploded, and I started thinking about what was going on here.

Does that mean there were a few apples that could do this, or does it mean that in more specific situations many people can actually do this?

So, as usual, I decided to try a simple experiment.

And here's how it looks.

If you were in an experiment, you would be given a piece of paper with 20 simple math problems that anyone could solve, but you wouldn't be given enough time.

After five minutes, he said, "Give me the paper. I'll pay you $1 per question."

people did this. I pay people $4 for their work. On average people solve four problems.

Some people try to cheat.

I give them the paper.

After 5 minutes, it says, 'Please shred the paper.

Put a small piece in your pocket or backpack and tell me how many questions you got right. ”

Today, people solve 7 questions on average.

Now, it's not as if there were a few bad apples, just a few people doing a lot of cheating.

Instead, what we've seen is a lot of people cheating a little bit.

Now, in economic theory, cheating is a very simple cost-benefit analysis.

What are the odds of being caught?

How much profit can be made from cheating?

Also, how much punishment will I get if I get caught?

Then weigh these options and do a simple cost-benefit analysis to decide if it's worth committing the crime.

So let's test this.

For some people, we've changed how much money they can miss - how much money they can steal.

We paid them 10 cents for each correct answer, 50 cents for each correct answer, $1, $5, and $10.

One might expect that the more money on the table, the more people would cheat, but that was not the case.

There were many people who stole and deceived little by little.

What are the odds of being caught?

Some even shredded half of the paper, so the evidence remained.

Some even shredded the whole paper.

Some shredded everything, walked out of their rooms, and paid themselves over $100 out of a bowl.

One might expect that lower odds of being caught would lead to more cheating, but again, this was not the case.

Again, many were fooled by little and were insensitive to these financial incentives.

So we said, "If people aren't sensitive to the explanations and these forces of economic rational theory, what's going on?"

And we thought maybe what was happening was that there were two forces.

On the one hand, we all want to look at ourselves in the mirror and feel good about ourselves, so we don't want to cheat.

On the other hand, you can cheat a little and be happy with yourself.

So perhaps what's happening now is that there are levels of cheating that we can't get past, but we can still benefit from lower levels of cheating as long as we don't change how we feel about ourselves.

We call this the personal fudge factor.

Now, how do you test your personal fudge factor?

First, we said, what can we do to reduce the fudge factor?

So we gathered people in the lab and said, "I have two tasks for you today."

First, half of the people were asked to recall the 10 books they read in high school, or the Ten Commandments, and then they were seduced with a cheat.

People who tried to remember the Ten Commandments turned out, but no one in our sample could remember all the Ten Commandments. But those who tried to remember the Ten Commandments were given the opportunity to cheat and did not cheat at all.

It's not that religious people, i.e., those who remember the commandments well, cheat less, and non-religious people, i.e., those who remember few commandments, cheat more.

People stopped cheating the moment they thought about remembering the Ten Commandments.

In fact, when you challenge self-proclaimed atheists to swear on the Bible and give them the chance to cheat, they won't cheat at all.

Now, the Ten Commandments are a difficult thing to bring into the educational system, so I said, "What if we got people to sign a code of honor?"

So we asked people to sign "I understand that this short questionnaire falls under the MIT Code of Honor."

Then they shredded it. No cheating whatsoever.

This is particularly interesting because MIT has no honor code.

(Laughter) So this was all about reducing the fudge factor.

What about increasing the fudge factor?

The first experiment involved walking around MIT and handing out six packs of Coke to the refrigerator. These were common undergraduate refrigerators.

And I'm back to measure what the jargon calls cola half-life, or how long a cola lasts in the fridge.

As you can imagine, it doesn't last very long. people get it.

In contrast, I took a plate of six one-dollar bills and left them in the same refrigerator.

My bill never disappeared.

Now, this is not a good social science experiment, so to make it even better, I did the same experiment I described earlier.

A third of the people we gave sheets to gave them back to us.

A third of the people we gave it to shredded and came to us and said, "Experimenter, I've solved X problems. Give me X dollars."

After shredding the pieces of paper, a third of the people came to us and said, "Experimenter, I have solved X problems. Give me X tokens."

We didn't pay them in dollars. We paid them for something else.

Then they picked up another one, walked 12 feet sideways, and exchanged it for dollars.

Consider this intuition:

How bad would it feel to bring a pencil home from work? How bad would it feel to bring home a dime from a small safe?

They feel completely different.

Will being paid in tokens make a difference just by stepping away from cash for a few seconds?

Our subjects doubled cheating.

I'll share my thoughts on this and the stock market shortly.

But this still didn't solve the big problem I had with Enron. Because Enron also has a social component.

People are watching each other's actions.

In fact, every day in the news we see examples of people cheating.

What does this cause us?

So I did another experiment.

We enrolled a large number of students in the experiment and prepaid.

So everyone received an envelope with money for the experiment and asked them to return the money they didn't make at the end. OK?

Same thing happens.

When we give people the opportunity to cheat, they cheat.

They cheat just a little bit, it's all the same.

But the experiment also hired acting students.

The acting student stood up after 30 seconds and said, "Everything's worked out. Now what do we do?"

And the experimenter said, "Please go home when you're done.

that's it. The mission is over. ”

So now we have a student, an acting student, who is part of our group.

No one knew it was an actor.

And they obviously cheated in a very serious way.

What will happen to the others in the group?

Will they cheat more or less?

what happens here?

Turns out it depends on what kind of sweatshirt they're wearing.

Here is the problem.

We've done this at Carnegie Mellon and Pittsburgh.

And Pittsburgh has two big universities, Carnegie Mellon University and the University of Pittsburgh.

All participants in the experiment were students at Carnegie Mellon University.

When the stand-up actor was a student at Carnegie Mellon University, he was actually a student at Carnegie Mellon University, but cheating increased when he was part of their group.

But when he was actually wearing a University of Pittsburgh sweatshirt, the cheating went away.

(Laughter) Now, this is important. Remember, the minute a student stood up, it was clear to everyone that cheating could be avoided. Because the experimenter said, "It's all over, go home," and they took the money.

So it wasn't all that important about the chances of getting caught again.

It was about cheating norms.

If someone in the group is cheating and we witness the cheating, we feel it is more appropriate for us as a group to behave this way.

But if it was someone from another group, this awful people, which is not terrible, but someone from another college, another group, that we don't want to be associated with, suddenly people become more aware of honesty, and it's a bit like the Ten Commandments experiment, people cheat less.

So what did this teach us about cheating?

It turns out that many people can cheat.

They cheat just a little bit.

Cheating goes down when we remind people of their morality.

People cheat more when they move away from the subject of cheating and money.

And when we see cheating around us, cheating increases, especially if it's part of our group.

Now let's think about what happens if we put this in the stock market.

What happens when you pay people a lot of money to build something to distort reality a little?

Can't they see it this way?

Of course I would.

What if you do something else, like remove things from your money?

We call them stocks, stock options, derivatives and mortgage-backed securities.

Maybe in those farther away, it's not a one-second token, but many steps away from the money for a much longer time - could people cheat even more?

And what happens to the social environment when people see other people's behavior around them?

I think all those forces worked very badly for the stock market.

More generally, I would like to talk about behavioral economics.

We have many intuitions in life, but the point is that many of these intuitions are wrong.

The question is, do you test that intuition?

We can think about how we test this intuition in our personal and business lives. Especially when it comes to policy, when we think about things like 'not leaving behind', when we create new stock markets, when we formulate other policies such as taxation and health care.

And the difficulty of testing my intuition was a big lesson I learned when I went and talked to the nurses again.

So I went back to talk to them and told them what I found out about removing the bandages.

And I learned two interesting things.

One was my favorite nurse, Etty, telling me I didn't consider her pain.

“Of course it must have been very hard for you,” she said.

But think of a time when I was a nurse and I was removing the bandages of someone I liked and doing it repeatedly for long periods of time.

Causing too much torture was not good for me either. ”

And she said maybe part of the reason was that it was difficult for her.

But it was actually more interesting than that. Because she said "I didn't think your intuition was correct.

I felt that my intuition was correct. ”

So when I consider all my intuition, I can't believe my intuition is wrong.

And she said, "Given the fact that I thought my intuition was right..."--she thought her intuition was right--it was very hard to accept doing a difficult experiment to see if I was wrong.

But in reality, this is the situation we all find ourselves in all the time.

We have very strong intuitions about everything: our own capabilities, how the economy works, how teachers are paid in school.

But you can't do better unless you start testing those intuitions.

And think how much better my life would have been if these nurses were willing to check their intuition, and how much better everything would have been if we started experimenting with our intuition more systematically.

thank you very much.

I am a professional troublemaker.

(Laughter) My job as a writer, speaker, and shady Nigerian is to criticize the world, poor institutions, and people who refuse to do better, so (Laughter) I feel my purpose is to be this cat.

(Laughter) I'm someone who wants to "fix" other people.

that's me

I hope we leave this world better than we started.

And how I choose to make a difference is to speak up, be the first and be the domino.

To topple a row of dominoes, one must fall first, and then the other must do the same.

And the falling dominoes, I hope the next person who sees this is inspired to be a domino.

To me, being a domino is akin to speaking up and doing something really hard in hopes that others will follow suit, especially when it's necessary.

The point here is that I am the one who says what you may have thought but didn't dare say.

Often people think we are fearless and those who do this are fearless.

We are not fearless.

We are not unafraid of the consequences and costs of speaking truth to power.

What happens is that we feel we have to. Because there are too few people in the world who want to be dominoes, and who are willing to accept their fall.

We are not doing it fearlessly.

Now let's talk about fear.

I knew exactly what I wanted to be when I grew up.

I thought, "I'm going to be a doctor!"

Dr. Lavi was a dream.

Before it was a topic, I was Dr. McStaffin.

(Laughter) And I remember when I went to college, my freshman year, I had to take Chemistry 101 as a premajor.

I got my first and last D in my academic career.

(Laughter) So I went to my advisor and said, "Okay, let's not have a criminal record. I don't even like hospitals because this doctor's job isn't going well."

So..."

(Laughter) "Let's consider it over."

And that same semester, I started blogging.

That was in 2003.

So that one dream was coming to an end and another began.

And when I lost my marketing job in 2010, what had been a cute hobby became my full-time job.

But it took me another two years before I could say, "I'm a writer."

Nine years after I started writing, before I said, "I'm a writer," I was afraid of what would happen without 401ks.

that's important to me. ”

(Laughter) I mean, it took me that long to own this, that was my goal.

And I realized that fear has a very tangible power to prevent us from acting or speaking as we are meant to.

And I thought, "Do you know?

I don't want fear to rule my life.

I'm not going to let fear dictate my actions. ”

And all these wonderful things started happening and the dominoes started falling.

So when I realized that, I thought, 'Okay, in 2015, I turned 30. This is going to be my 'just do it' year.' Whatever scares me, I will actively pursue it. ”

So, I'm a Capricorn.

I like the feeling of being firmly grounded on the ground.

For the first time in my life, I decided to take a vacation alone. It was the Dominican Republic abroad.

So what did I do on my birthday?

Ziplining through the forest of Punta Cana.

And for some strange reason, I wore business casual.

Please don't ask me why.

(laughs) And we had a great time.

Also, I hate being in the water.

Again, I like to stand on solid ground.

So I went to Mexico and swam underwater with dolphins.

And the great thing I did that year was that it was my mountain. Writing a book called "I'm Judging You: The Do-Better Manual". And I had to own the whole writing process.

yes.

But the very anti-private thing I did that year left me horrified. It went skydiving.

We are about to fall out of the plane.

"I've done some stupid things in my life, and this is one of them," I thought.

(Laughter.) And then we're falling to Earth, and I literally lost my breath when I saw the Earth. It was like, 'I fell off a perfectly good plane on purpose.'

(laughs) "What am I doing wrong?!"

But when I saw the beauty, I thought, 'This is the best I can do.

This was a great decision. ”

And think about when you have to tell the truth.

I feel like I'm about to fall out of an airplane.

It feels like that moment when you're on the edge of an airplane and you think, 'I should stop doing this,' but I still know I have to do it, so I do it anyway.

It's comfortable for me to sit on the edge of that plane and stay in that plane.

And every day I feel like I'm falling out of that dimension because I'm telling the truth to organizations and people bigger than me and to forces stronger than me.

However, I found comfort to be overrated.

Because it's nice to be quiet.

It's comfortable to keep things as they are.

And comfort only maintains the status quo.

Therefore, we must get used to feeling uncomfortable by speaking these hard truths when necessary.

And I -- (applause) But I understand that I have to speak these truths because honesty is so important to me.

My honesty is what I value.

Justice -- I don't think justice should be an option.

We must always have justice.

I also believe in shea butter as a core value, and -- (laughter) I think the world would be better with more hydration.

But other than that, with these as my core values, I have to speak the truth.

But professional troublemakers like me shouldn't be the only ones to focus on falling out of planes all the time or being the first to fall dominoes.

People are so afraid of these serious consequences, but they don't realize that many times when we walk in a room we are some of the most powerful people in that room, that we might be the second or third strongest.

And we strongly believe that our job in that era is to disrupt what is happening.

And even if we are not the most powerful, if two more are united, we will be.

It's like co-signing a woman in a meeting, a woman who can't get her point across. Or it's like making sure that the opinions of others who can't stand up for themselves are heard.

Our job is to make sure they have room for that.

Everyone's happiness is a community business.

Emphasize that, and you'll understand that if you're ready to help someone when they need help, you don't have to look around so hard.

And there are times when I feel like a very public downfall, like when I'm asked to speak at a conference and they want me to pay to get there.

After doing a little research, I found that the white man who spoke there was compensated and had travel expenses paid.

The white women who spoke there were paid for their travel expenses.

The black women who spoke there were actually expected to pay a speaking fee.

And I thought, "What should I do?"

And I knew that if I spoke publicly about this, I could face financial losses.

But at the same time, I also realized that my silence would serve no one.

So when I was timidly talking about it publicly, other women started coming out saying, "I've faced this kind of pay gap too."

And so began a conversation about discriminatory wage practices that this meeting was a part of.

When I read and wrote about a disturbing memoir by a celebrity, I felt like a domino.

I knew this person was more powerful than me and could impact my career, but I was like, 'I have to do this.

And I did. Then I hit "publish" and ran away.

(Laughter) And then coming back to the viral post, people were like, 'Oh my God, I'm so glad someone finally said this.

And then a conversation about mental health and self-care started and I thought,

I think what I'm doing is, well, doing something. ”

And so many people fall dominoes when they talk about how they were assaulted by those in power.

And millions of women came to join in and say "Me too."

So thanks to Tarana Burke for igniting that movement.

(Applause.) People and systems rely on our silence to keep us in the right place.

Now, being a domino sometimes requires being yourself, after all.

I mean, I've been a shady person since I was three years old.

(Laughter) This is me on my 3rd birthday.

But I've been this girl all my life, and I feel like even that was a domino. Because in a world that wants us to represent ourselves, being ourselves can be a revolutionary act.

And in a world that wants us to whisper, I chose to shout.

(Applause.) When the time comes to say these difficult things, I ask myself three things.

1: Are you serious?

2: Can you defend me?

3: Did you say it with love?

If all three answers are yes, say so and drop the chip.

It's important.

Checkpoints with myself always tell me, "Yes, you should do this."

Telling the truth, telling the thoughtful truth, should not be a revolutionary act.

Telling the truth to those in power shouldn't come at a cost, but it does.

But I think if more of us chose to do this for the greater good, we would be in a better place than we are now.

When it comes to the greater good, I think we're all about telling the truth to build bridges to common ground, but bridges that aren't grounded in truth will crumble.

Therefore, it is our job, our duty, our obligation to speak the truth and be dominoes to those in power, not only in difficult times, but especially in difficult times.

thank you.

(applause)

About four years ago, the New Yorker published an article about a cache of dodo bones found in a hole on the island of Mauritius.

Today, Mauritius, a small island off the east coast of Madagascar in the Indian Ocean, is where the dodo bird was discovered and went extinct within about 150 years.

Everyone was very excited about this archaeological find because it meant that they might finally be able to assemble a single dodo skeleton.

While museums around the world have collections of dodo skeletons, not even an actual natural history museum on the island of Mauritius has a skeleton made from the bones of a single dodo.

Well, this isn't exactly true.

In fact, the British Museum held a complete specimen of the dodo until the 18th century. All the skin was actually mummified as well, but in order to save space, I actually cut off the head and legs and roasted the rest over an open fire.

If you look at their website today, they actually have a list of these specimens and it says the rest were lost in the fire.

not entirely true. anyway.

This photo was the frontispiece for this article. I'm one of those people who thinks it's great that Tina Brown has delivered a photo to The New Yorker. Because this photo completely rocked my world.

I fell in love with this object. Not just the beautiful photograph itself, but the colors, the shallow depth of field, the visible details, the wire that appears to be the beak that the conservator used to construct this skeleton, everything is here.

And wouldn't it be great to have your own dodo skeleton?

(Laughter) I want to point out that I've spent my entire life obsessed with objects and the stories they tell, but this was only recently.

So I started looking to see if anyone had a kit or available model for sale. And I found a lot of references and a lot of nice pictures.

No dice for me, no dodo skeleton. However, the damage was done.

I had hundreds of photos of dodo skeletons in my "Creative Projects" folder. This is my brain's repository, everything I might be interested in.

Whenever you have an internet connection, everything from beautiful rings to cockpit photos pours into it.

The key sent by the Marquis de Lafayette to George Washington to celebrate the storming of the Bastille.

Russian Nuclear Launch Key: Above is a picture of what I found on eBay. The bottom one is the one I made for myself. Because I couldn't afford to buy it on eBay.

Stormtrooper costume. Map of Middle-earth -- it's hand drawn by me. There is a dodo skeleton folder.

This folder contains 17,000 photos (over 20 GB of information) and it's growing.

And then one day, a few weeks later, maybe a year later, I was at an art supply store with my kids, buying clay tools. We were supposed to have a craft day.

I bought super sculpey, armature wire, and various materials.

And I looked down at this Sculpey and thought, maybe, well, I could make my own dodo skull.

At this point I should point out that I am not a sculptor. I'm a hardcore model maker.

They'll draw pictures, they'll give you props to replicate, they'll give you cranes, scaffolding, Star Wars parts, especially Star Wars parts - I can do this all day long.

That's exactly how I made my living for 15 years.

But you gave me something like this - my friend Mike Mahne sculpted this. It's a "Star Wars Episode 2" maquette -- it's not mine -- it's made by someone else -- a dragon or a soft one.

But I've seen enough pictures of dodo skulls to feel like I can actually understand the topology and possibly recreate it. I mean, it's not that hard.

So I started looking for the best photos I could find.

After getting all the references, I found this nice reference.

This is the person selling this on eBay. It was clearly a woman's hand, preferably a woman's hand.

Assuming it was roughly the size of my wife's hand, I took some measurements of her thumb and enlarged them to fit her skull size.

I scaled it up to its actual size and used it in conjunction with all the other standards I had on hand and compared it as a size reference to get an accurate picture of beak size, length, etc.

And over the course of several hours, I ended up with a fairly reasonable dodo skull. And I didn't mean to go on, I mean, it's like I can clean a very messy room only by picking things up one at a time. Wholeness cannot be considered.

I hadn't thought about the dodo skeleton. When I completed this skull, I noticed that the armature wires that had held the skull up until now were sticking out of the back where the spine would be.

And one of the other things I've been interested in and obsessed with over the years are spines and skeletons, and I've collected hundreds of them.

In fact, I knew enough how the vertebrae worked that I began to imitate them.

And button by button, spine by spine, I built my way.

And indeed, by the end of the day, I had a decent skull, reasonably good vertebrae, and half a pelvis.

And again, I continued to look for more references, looking for drawings, beautiful photographs, or whatever reference material I could find.

This guy -- I love this guy! He used a ruler to place the dodo's leg bones into the scanner.

This is the accuracy I was hoping for, replicating and embedding down to the last bone.

And after about 6 weeks I had my dodo skeleton completed, painted and installed.

You can see I also made a museum label with a brief history of the dodo.

And TAP Plastics made me a museum piece, even though they didn't photograph me.

I don't have that kind of space at home, but I had to finish what I started.

And this actually represented a big change for me.

Again, as I said earlier, my life has also been about being fascinated by things and the stories they tell, making things for myself, getting them, seeing them, and diving into them.

And in this folder called "Creative Projects", there are many projects that I am currently working on, projects that I am already working on, things that I would like to work on someday, things that I want to look for, buy, see and touch.

But now there could potentially be new and different categories that I can sculpt. I mean, I - you know, I have my own R2D2, which - to be honest, is easier for me than sculpting.

So I went back to my Creative Projects folder and found a Maltese Peregrine Falcon.

Now this is interesting to me. Falling in love with something in Hammett's novels is, if it's true that the world is divided into two kinds of people, Chandlers and Hammetts, I'm definitely a Chandler.

But in this case it is not about the author, not about the book or the film or the story, but about the object itself.

And in this case, this object -- will play at different levels.

First of all, there are objects in the world.

This is "The Hawk of Knyphausen".

This is a ceremonial pouring vessel made for a Swedish count around 1700, and it is very likely that Hammett was the inspiration for the Maltese Falcon.

Then there's the fictional bird that Hammett created for the book.

Constructed from words, it is the engine that drives the plots of his books and films, within which other objects are created. Inspired by Knyphausen's falcon, Hammett's representation of the word-created prop represents the falcon in the film.

And then there's this fourth level, which is a whole new object in the world. A prop made for a film, a representative of that thing, becomes something else in itself, an object of entirely new desire.

And now it's time to do some research.

Actually, I was doing some research a few years ago. That's why this folder existed.

I had purchased a Maltese falcon replica on eBay, a really poor replica, and had actually downloaded enough pictures to be of some reference.

However, upon further research, I needed a really accurate reference and found that one of the original lead birds was sold at Christie's in 1994. So I contacted a secondhand bookstore that had the original Christie's catalog and found this great photo in it with a size reference.

I was able to scan a photo and scale it to full size with precision.

I found other references. New Jersey editor Avi [Ala] Chekmayan actually found this resinous Maltese falcon at a flea market in 1991. However, due to the many controversies surrounding this bird, it took us five years to certify it to the auctioneer's specifications.

It was made of resin, which was not a common material for movie props at the time the film was made.

It's funny to me that it took me a while to authenticate it. Because you can see it in comparison. And this is the real thing, the real thing, because you can say it's made from the exact same mould.

The auction was actually so controversial that an auction company called Profile in History sold it. I think it was 1995, it was about $100,000. In fact, as you can see here at the bottom, it included not only the front view, but also the side, back, and other side views.

We now have all the topology we need to replicate the Maltese Falcon.

what are they doing? How do you start something like that? I really don't understand.

So what I did was scale all the references up to full size, cut out the negatives, and use those templates as shape references, just like I did with the dodo skull.

So I used Sculpey to make a big block and iterate until I got the right profile.

And slowly, feather by feather, detail by detail, I worked and achieved. I worked in front of the TV and Super Sculpey. This is me sitting next to my wife. This is the only photo I took of the whole process.

Going forward, we have completed a very reasonable reproduction of the Maltese Peregrine Falcon.

But again, I'm not a sculptor, so I don't know many tricks. For example, I don't know how my friend Mike uses Sculpey to create a beautiful glossy surface. I certainly couldn't get it.

So I went to my shop and molded it and cast it in resin. Because with resin, you can get an absolutely smooth finish on the glass.

Now there are many ways to fill it in and give it a beautiful, smooth finish.

My preference is about 70 coats of matte black autoprimer.

If you keep spraying it for 3-4 days, it will drip, but you can really, really gently polish the surface and get a glass-smooth surface.

Oh, and finished with triple zero steel wool.

Now, the cool thing about getting to this point is that at the end of the movie, when you take the bird out and put it on the table, you actually rotate the bird.

So I actually took a screenshot and a freeze frame and checked it.

And I'm tracking all the light movements on this object and making sure I get the same kind of reflection when I hit the light at the same position. That's the level of detail I'm working on with this issue.

I finally got this. This is my Maltese Falcon.

And it's beautiful. And at this point of completion, I can authoritatively assert that, of all the replicas out there, and there are some, this is by far the most accurate representation of the original Maltese falcon ever sculpted. Well, let me tell you that the original was sculpted by a man named Fred Sexton.

Here's where it gets weird.

Fred Sexton was a friend of this man, George Hodel.

A Terrible Man -- Many agree that he was the killer of the Black Dahlia.

James Ellroy now believes that Maltese falcon sculptor Fred Sexton murdered James Ellroy's mother.

In 1974, the original plaster of the Maltese Falcon was stolen from the museum at the Los Angeles County Museum of Art during the making of The Black Bird, a bizarre comedy sequel to The Maltese Falcon starring George Segal. I believe the original plaster of the Maltese Falcon was probably one of the 6 plaster made for the film. Many thought this was a publicity stunt for the film.

John's Grill, which actually makes a brief appearance in "The Maltese Falcon," is a San Francisco eatery that still exists today.

It remained in a cabinet for about 15 years until it was stolen in January 2007.

The object of desire seems to prove its worth only by repeatedly vanishing.

So I had this Falcon and it was lovely. It looked really nice and the light worked really well, better than anything I could achieve or get in the world.

However, there was a problem. And the problem was that I needed the whole object and I needed the weight behind the object.

It's made of plastic so it's too light.

I have an online group that I join frequently.

It's a group of prop enthusiasts like myself called the Replica Props Forum, people who exchange, create, and travel about movie props.

And one of the guys there, a friend of mine who I never actually met but became friends with through some gadget deals, turned out to be the manager of the local foundry.

He took the pattern from my master Falcon and actually made a bronze lost wax casting for me. And here is the bronze I am back with.

And here it is after an acid etch.

And this gives me great satisfaction.

I'm going to take it out there later tonight, so I'd like you to pick it up and handle it.

You want to know how crazy I am. This project is my own, but I even went so far as to buy a Chinese newspaper from San Francisco in 1941 on eBay to properly wrap the bird...

like in the movies.

(laughs) Yes, I understand!

(Laughter.) (Applause.) As you can see, it weighs 27 and a half pounds.

This is half my dog ​​Huxley's weight.

But there is a problem.

Well, here are the latest advancements for the Falcons.

The one on the far left is junk, a replica I bought on eBay.

I have my Sculpey Falcon which is a bit ruined because I had to take it out of the mold. There's my first casting, there's my master, there's my bronze.

It can happen when molding or casting objects. It loses a little bit of volume and size each time it's tossed into silicone and cast into resin.

And when I held my bronze model up against the Sculpey model, the bronze model was three-quarters of an inch shorter.

yeah no really this is oh why didn't i remember this

Why didn't I start and make it bigger?

So what should i do? I think you have two options.

One is to shoot terrifying lasers and perform 3D scans. You are already doing this. I have a 3D scan of this Falcon.

We plan to know the exact amount of shrinkage from the wax master to the bronze master, make it big enough to create a 3D lithography master, polish it and send it to the mold maker to finish it in bronze. Or how many people own the originals. I spent a few minutes in front of one of the real birds, snapped a picture, pulled out my handheld laser scanner that fits in a box of cereal, and am trying to get in touch with it in hopes of getting a perfect 3D scan without even touching the bird. And I'm going to sign a page swearing I'll never give it to anyone but me in the office.

If they want it, I'll give them one.

And maybe then I'll finish this exercise.

But really, if we're all going to be honest with ourselves, we have to admit that completing the exercise to the end wasn't the purpose of the exercise in the first place.

thank you.

I have been working as a political cartoonist on the world stage for the past 20 years.

Hey, we've seen a lot happen in the last 20 years.

We saw three different Catholic Popes and witnessed their unique moments. It was the moment of the Pope's election in St. Peter's Square. Here's a little white smoke and an official announcement.

[It's a boy!] (Laughter) (Applause) We saw four American presidents.

Obama, of course.

Oh, Europeans liked him very much.

He was a multilateralist.

He supported diplomacy.

He wanted to be friends with Iran.

(Laughter) And then...

Reality imitated the caricature of the day Donald Trump became President of the United States.

(Laughter) (Applause) People come to us and say, "It's too easy for cartoonists. I mean, people like Trump?"

No, it's not easy to caricature a man who is himself a caricature.

(laughter) No.

(Applause.) Populists are not easy targets for satire. Because if you try to nail them one day, they will pass you the next day.

For example, I imagined the tweets Trump would send on Christmas Eve, as soon as he was elected.

So I did this, okay?

[Merry Christmas everyone! Except for the poor losers. so sad. (Laughter) And in short, the next day Trump tweeted: [Happy New Year to all of you, including my many enemies and those who fought me and lost so badly that they don't know what to do. I love you! ] (laughs) It's the same!

(Applause) This is the age of the strong.

And soon, Donald Trump was able to meet his personal hero, Vladimir Putin, and here's what the first meeting looked like: [Help find hackers. Please tell me the password. ] (Laughter) Besides, I didn't invent anything.

He said that after the initial talks, the two sides had agreed to set up a joint task force on cybersecurity.

This is true, if you remember.

Oh, who would have imagined what we have seen in the last 20 years?

We saw the UK running towards leaving the European Union.

[Hard Brexit? [Laughter] In the Middle East, for a while, we believed in the miracle of Arab Spring democracy.

We have seen dictators fall, but we have seen others hang on.

(Laughter.) And then there's the timeless North Korean Kim dynasty.

These guys look like they came straight out of Cartoon Network.

I was happy to be able to draw two of them.

It was a very dangerous moment when his father, Kim Jong Il, died a few years ago.

[It was on the verge!] (Laughter) That's -- (applause) And my son, Kim Jong-un, has proven himself worthy of being the heir to the throne.

He is now friends with the President of the United States.

They see each other all the time and talk like friends.

[What kind of hair gel is it? [Laughter] Should we be surprised that we live in a world dominated by egomania?

What if they were simply a reflection of ourselves?

I mean, look at each one of us.

(Laughter) Well, we love smartphones. We love selfies. we love ourselves

Thanks to Facebook, I have many friends all over the world.

Mark Zuckerberg is our friend.

(Laughter.) As you know, he and his Silicon Valley peers are modern-day kings and emperors.

To show that the emperor is undressed is the work of satire, isn't it?

Tell the truth to those in power.

This has always been the historical role of political cartoons.

In the 1830s, journalists and cartoonists fought hard for press freedom in post-revolutionary France under King Louis-Philippe.

They were imprisoned and fined, but they won.

And this caricature of the king by Daumier came to define the monarch.

It made history.

It has become a timeless symbol of satire triumphing over dictatorship.

200 years after Daumier, are political cartoons on the brink of extinction?

Take this blank space on the front page of the Turkish opposition newspaper Cumhuriyet.

This is where the Musa Kart cartoon once appeared.

In 2018, Musa Kurt was sentenced to three years in prison.

For what?

For drawing political cartoons in Erdogan's Turkey.

Cartoonists from Venezuela, Russia and Syria have been forced into exile.

Look at this image.

Sounds so innocent, right?

But it is very provocative.

When Hani Abbas posted this image, he knew it would change his life.

It was 2012 and Syrians were taking to the streets.

Of course, the little red flower is a symbol of the Syrian Revolution.

The regime soon tracked him down and he had to flee the country.

His best friend, cartoonist Akram Raslan, was not allowed to leave Syria.

He was tortured to death.

Recently in the United States, top cartoonists like Nick Anderson and Rob Rogers — this is a cartoon by Rob — [Anniversary 2018. (to gravestone) Truth. honor. Rule of Law] They lost their position because the publisher decided their work was too critical of Trump.

And the same thing happened with Canadian cartoonist Michael de Adder.

Hey, maybe you should start worrying.

Political cartoons were born with democracy, but where there is freedom they are challenged.

As you know, for many years at the Cartooning for Peace Foundation and other endeavors, Kofi Annan - lesser known - the late Nobel Peace Prize Laureate Kofi Annan served as the Foundation's Honorary President.

He was a great defender of comics.

Alternatively, on the Board of Directors of the Editorial Cartoonists Association of America, we have advocated on behalf of cartoonists who have been jailed, threatened, fired, and exiled.

However, I have never seen anyone lose their job because of a manga they didn't draw.

Well that happened to me.

For the past 20 years, I have worked for the International Herald Tribune and the New York Times.

Then something happened.

In April 2019, a cartoon by the famous Portuguese cartoonist first published in the Lisbon newspaper El Expresso was selected by the editors of The New York Times to be reprinted in its international edition.

This exploded.

It was accused of being anti-Semitic, sparked widespread outrage, and was followed by an apology and numerous damage controls by The Times.

A month later, the editor said he was quitting political cartoons once and for all.

So we can and should discuss the cartoon.

Some say it reminds them of anti-Semitic propaganda at its worst.

Other countries, including Israel, have said no, a harsh criticism of Trump, who has been shown to blindly follow the Israeli prime minister.

There are some issues with the cartoon, but the discussion was not made in The New York Times.

Under attack, they chose the easiest path. To avoid problems with political cartoons in the future, let's not have cartoons at all.

Hi, this is new.

Have we just invented preventative self-censorship?

I think it's bigger than the cartoon.

This is about opinion and journalism.

This is, after all, a matter of democracy.

We now live in a world where a moralistic mob gathers on social media and rises by storm.

The most outraged voices tend to dictate the conversation, followed by the angry crowd.

These social media mobs, sometimes fueled by interest groups, strike newsrooms with crushing blows.

Publishers and editors are scrambling to take action.

This leaves no room for meaningful discussion.

Twitter is a place for anger, not discussion.

And what do you know?

Someone very well explained our human condition in these tumultuous times.

do you know who

Shakespeare, 400 years ago.

["(Life is) a story told by fools who mean nothing, full of noise and fury."] This speaks to me. Shakespeare is still very important, right?

But the world has changed a little.

[Too long!] (Laughter) It's true.

(Applause.) As you know, social media is both a blessing and a curse for comics.

We are in the age of images, so images are shared and viral, but that is also the primary target.

In many cases, the real target behind a cartoon is the media that published it.

[Iraq coverage? No, it's Trump!] The relationship between traditional media and social media is an interesting one.

On the one hand, there is the time-consuming process of information, verification, and curation.

On the other hand, frankly, it's an open buffet for rumors, opinions, and sentiments amplified by algorithms.

Even quality newspapers mimic the code of social networks on their websites.

Highlight the 10 most read and 10 most shared stories.

They should suggest the 10 most important stories.

(Applause.) The media should stop being scared of social media, and editors should stop being scared of angry mobs.

(Applause.) You're not going to put a warning on your cigarette pack.

[Satire can hurt your feelings] (laughter) Come on.

[There may be a sex bomb hidden under the burkini] Political cartoons are meant to provoke as much as opinion.

But first and foremost, they are meant to make you think.

Are you hurt?

leave me alone

don't you like that?

Look in a different direction.

Freedom of expression is not incompatible with dialogue and listening to each other.

But it is incompatible with intolerance.

(Applause.) Let us not be censors ourselves in the name of political correctness.

We must stand up, we must resist. Otherwise, when you wake up tomorrow, any kind of satire or political cartoon will be impossible in a sanitized world.

Because when political pressure meets political correctness, free speech disappears.

(Applause) Remember January 2015?

With the massacre of journalists and cartoonists at Paris' Charlie Hebdo, we discover the most extreme form of censorship: murder.

Remember how it felt.

[Without humor we're all dead.] No matter what anyone thought about that satirical magazine, no matter what they felt about that particular cartoon, everyone felt that something fundamental was at stake, that the people of a free society, indeed of any society, needed humor as much as the air they breathed.

This is why extremists, dictators, dictators, and frankly all ideologues around the world can't stand humor.

In the crazy world we currently live in, political cartoons are needed more than ever.

And we need humor.

thank you.

(applause)

“Dozens of hours can affect the outcome of an entire life/And when they do, they are like the wreckage of a burnt clock salvaged … must be resurrected from the ruins and examined.” This is the premise of Arundhati Roy's 1997 novel The God of Small Things.

Set in the town of Ayemenem in the Indian state of Kerala, the story revolves around fraternal twins Rahel and Esther who have been separated for 23 years, dozens of hours after their cousin drowns, their mother's affair is exposed, and their lover is murdered.

Although the book is set at the time of Rachel and Esta's reunion, the story largely reframes the details of the tragic events that took place in the past and led to their breakup.

Roy's rich diction and brilliant storytelling earned her the prestigious Booker Prize for "The God of Small Things."

In the novel, she questions the culture of her native India, including social conventions and colonial history.

One of her focuses is the caste system, a millennia-old way of classifying people according to hereditary social classes.

By the mid-20th century, the four original castes associated with specific occupations had split into about 3,000 subcastes.

Although the caste system was abolished in the constitution in 1950, social life in India continues to be shaped by the caste system, which routinely marginalizes people of lower castes.

In the novel, Rahel and Esta have a close relationship with Verusa, a worker in the family's pickle factory and a member of the so-called "untouchable" caste.

When Verusa and her twin mother, Ammu, embarked on an affair, they violated Roy's "love law," which forbids intimacy between different castes.

Roy warns that the tragic consequences of their relationship "will forever lurk in the mundane," including "coat hangers," "tar on the road," and "lack of words." Roy's writing makes constant use of these banalities, bringing even the most tragic moments with rich detail.

The book begins with the funeral of Sophie, her half-English twin cousin, after she drowns.

While families are grieving, lilies are curled up and refreshed in the hot church.

A baby bat crawls up a funeral saree.

Tears roll down my chin like raindrops falling from the roof.

The novel goes back in time and explores the struggles of its characters operating in a world they don't quite fit in alongside the country's political turmoil.

Ammu struggles not to lash out at her beloved children when she feels especially trapped in her parents' small-town home, and when neighbors criticize her for divorcing and feel alienated.

Verusa, on the other hand, weighs her relationship with Ammu and her friendship with the twins not only for employment in their family, but also for joining the budding communist anti-communist movement against Indira Gandhi's "Green Revolution." In the 1960s, the misleadingly named "Green Revolution" introduced chemical fertilizers, pesticides and river dams to India.

While these policies produced high-yielding crops and averted hunger, they also displaced lower-caste people from the land and caused widespread environmental destruction.

When the twins return to Ayemenem as adults, the effects of the Green Revolution spread around them.

The river, full of vitality in their childhood, greets them "with holes where their teeth used to be, limp hands lifted from hospital beds and grinning skulls." While exploring the depths of the human experience, Roy never loses sight of how his characters are shaped by the times and places they live.

In the world of "God of Little Things", "various despairs were vying for dominance... personal despair is not enough..."

Personal turmoil stopped at roadside shrines in the nation's vast, violent, spinning, driving, ridiculous, insane, impracticable public turmoil. ”

"If you don't know where you're going, you might not get there," said US baseball player and philosopher Yogi Berra.

Accumulating scientific knowledge will give us greater insight and clearer information about what our future holds in the face of climate change and what that means for our health.

I am here to talk about a related aspect of how the greenhouse gas emissions from burning fossil fuels are making food less nutritious.

Start with the food pyramid.

We all know the “Food Pyramid”.

We all need to eat a balanced diet.

We need protein, micronutrients and vitamins.

So this is how we think about how to make sure we get what we need every day so that we can grow and thrive.

But we don't just eat because we need to, we eat because we enjoy it.

There are a wide variety of culturally significant foods such as bread, pasta and pizza.

We look forward to eating this.

So while they are important to our diet, they are also important to our culture.

Carbon dioxide has been increasing since the beginning of the industrial revolution, from about 280 ppm to over 410 ppm today, and it continues to rise.

The carbon needed for plant growth is obtained from this carbon dioxide.

They bring it into plants, break it down into carbon itself, and use it for growth.

It also needs nutrients from the soil.

Yes, carbon dioxide is plant nutrition.

And rising carbon dioxide levels should be good news for global food security, ensuring that people are getting enough each day.

Approximately 820 million people worldwide do not eat enough food every day.

That said, a fair amount of paper has been written about how increasing carbon dioxide can help with food security issues.

To feed the nine to ten billion people alive in 2050 and achieve the Sustainable Development Goals, especially Goal 2 to reduce food insecurity, increase nutrition and increase access to essential food for all, we need to accelerate agricultural productivity growth.

We know that climate change is affecting agricultural productivity.

Since pre-industrial times, the earth has warmed about 1 degree Celsius.

This is changing regional temperature and precipitation patterns, affecting agricultural productivity in many parts of the world.

And it's not just local changes in temperature and precipitation, it's also extreme changes.

Extreme events such as heat waves, floods and droughts are having a huge impact on productivity.

And carbon dioxide not only makes plants grow, but also has other effects. Higher carbon dioxide causes plants to increase synthesis of carbohydrates, sugars and starches and reduce the concentration of protein and vital nutrients.

And this is very important for how we think about food security going forward.

A few nights ago, at a table talk on climate change, someone said, ``We're 5/7 optimists.

When it comes to micronutrients, almost all of them are affected by higher CO2 concentrations.

Two in particular are iron and zinc.

A lack of iron can lead to iron deficiency anemia.

It's also associated with fatigue, shortness of breath, and some pretty serious consequences.

Lack of zinc can reduce appetite.

It has become a serious problem all over the world.

About 1 billion people are zinc deficient.

It is very important for maternal and child health.

It affects development.

B vitamins are important for many reasons.

They help convert our food into energy.

These are important for the functioning of many physiological activities in our body.

And when the carbon in the plant increases, the nitrogen decreases, and the vitamin B group also decreases.

It's not just us.

Cattle are already affected due to declining feed quality.

In fact, this affects everyone who consumes plants.

For example, consider our pet cats and dogs.

If you look at the labels on most pet and dog foods, they contain significant amounts of grains.

So this affects everyone.

How do we know this is the problem?

We know this from field research and from laboratory experiments.

Fieldwork mainly focuses on wheat and rice, but for example there is a rice field divided into different plots.

And the parcels are all the same. Same soil, same rainfall, same everything.

Except some compartments have carbon dioxide blown away.

So you can compare what it looks like under today's conditions and carbon dioxide conditions later in the century.

I participated in one of the few studies that did this.

We investigated 18 rice lines from China and Japan and cultivated them under conditions expected in the second half of this century.

Looking at the results, the white bar is today's situation and the red bar is the situation in the second half of this century.

That means about 10 percent less protein, about 8 percent less iron, and about 5 percent less zinc.

These don't sound like much of a change, but when you start thinking about poor people in countries who eat mostly starch, this leads to all sorts of health problems with glaring deficiencies in those on the edge.

This situation is more important for B vitamins.

Focusing on vitamin B1 and vitamin B2, there is a decrease of about 17 percent.

Pantothenic acid and vitamin B5 decreased by about 13 percent.

Folate is reduced by about 30 percent.

These are averages from different experiments performed.

Folic acid is essential for a child's development.

Pregnant women who don't get enough folic acid are at a much higher risk of having babies with birth defects.

So as CO2 continues to increase, these have the potential to have very serious effects on our health.

In another example, this is the modeling work done by Chris Weyant and his colleagues, looking at this chain from increased CO2 to decreased iron and zinc, with different health outcomes, focusing only on iron and zinc.

They looked at malaria, diarrheal diseases, pneumonia, and iron deficiency anemia to see what the impact would be in 2050.

And the darker this color, the greater its effect.

So you can see that Asia and Africa have a big impact, but keep in mind that populations can also be affected in countries such as the United States and European countries.

They estimated that about 125 million people could be affected.

They also modeled what the most effective interventions would be, the conclusion being greenhouse gas reductions. That means reducing greenhouse gas emissions by mid-century and worrying less about the impacts of the second half of the century.

Climate change itself was not considered in these experiments and modeling studies.

They only focused on the carbon dioxide component.

So when you combine the two, I would expect the impact to be much greater than what I've talked about.

I would appreciate it if you could tell me right now how the food you ate for breakfast, and the food you will eat for lunch, is different in terms of nutritional value from what your grandparents ate.

But I can't.

There are no studies on it.

I would like to talk about how current food insecurity is being affected by these changes.

But I can't.

There are no studies on it.

There is a lot to know in this area, including what the possible solutions are.

I'm not exactly sure what those solutions are, but there are different options.

Technology is advancing.

We breed plants. It is bio-enhanced.

Soil can make a difference.

And, of course, knowing how these changes might affect our future health and the health of our children and grandchildren is very helpful.

And those investments take time.

It will take time to resolve all these issues.

No national agency or corporate group has funded this research.

We desperately need these investments to see where we're headed.

In the meantime, what we can do is make complete meals accessible to all, not just in wealthy parts of the world, but everywhere in the world.

We also need to reduce greenhouse gas emissions, individually and collectively, to mitigate the challenges that will arise in the second half of this century.

It is often said that if you think education costs money, try ignorance.

let's not

Invest in yourself, your children and the planet.

thank you.

(applause)

I don't know what the hell you're doing here.

I was born in the Scottish Presbyterian ghetto in Canada and dropped out of high school. I don't have a mobile phone and I draw on paper using gouache that hasn't changed in 600 years.

But about three years ago, I held an art show in New York and called it "Serious Nansense."

So I think I'm actually one of the first here, I'm leading the way.

I called it "Serious Nonsense" because on the serious side it uses the painstaking realism techniques of editorial illustrations from my childhood. I imitated it, but never forgot it. That's the only style I know of. And it's very solid and formal.

Meanwhile, as you can see, I'm using nonsense language.

This is a Scottish castle where people were playing golf indoors and the trick was to hit the golf ball into the armor. I can't see it there.

This is part of a series called "Zany Afternoons", which has been turned into a book.

This is a homemade rocket propelled car. This is a 1953 Henry J in a quiet neighborhood of Toledo. I don't know if it's real or not.

This is my entry for the Los Angeles Film Museum.

You'll probably find that Frank Gehry and I are from the same town.

My work is so personal and bizarre that I have to invent my own glossary.

And I often work on something called "retrofuturism." This is about looking back and seeing what yesterday looks like tomorrow.

And they are always wrong, always cheerfully and optimistically wrong.

And its peak was in the 30s. The Great Depression was so disastrous that nothing escaped from the present into the future...

And technology has taken us.

This is my favorite workbench. The science magazines that were popular at the time - I had a huge collection of science magazines from the 30's - they were just poor people being asked to make sunglasses out of wire hangers, or dreaming about all improvisation and this wonderful giant wireless robot playing ice hockey at 300 miles an hour. It will all happen, everything will be great.

Automotive retro-future is one of my specialties.

I've been an automotive illustrator and copywriter for automotive advertising, so working on this subject is very rewarding.

Detroit has always been half the future, the advertising half.

This is a '58 bulgemobile. It's so new that tomorrow looks like yesterday.

This is a chain gang of guys who love cars.

This is from the entire catalog, about 18 pages, and it goes back to my time studying Lamphun in earnest.

Technoarchaeology is digging up and discovering miracles of the past that never happened. There's usually a good reason for that.

Zeppelin airship -- This is apparently from a brochure about a Zeppelin airship based on the Hindenburg.

However, the Zeppelin type airship was the largest moving object ever made by mankind.

And at an altitude where you could hear dogs barking, at Buick speeds, carrying 56 people, the flight cost twice as much as a first class cabin on the Normandy.

So the Hindenburg was not, and it was inevitable that it would disappear.

This is an autogyro horse race in Malibu in the 30's.

The autogyro couldn't wait for the invention of the helicopter, but it should have. It wasn't a huge success.

By the way, this is technically the only Spanish innovation of the 20th century.

I needed to know that.

A flying car that never got off the ground was a post-war dream.

My old man used to say he was going to get a flying car.

It's set in the future from 1946, looking ahead to the day every American family has one.

"That's Moscow, Shirley. I hope they can speak Esperanto!"

I'm not famous for fake nostalgia, but I'm very committed to it.

It is a painfully sentimental yearning for a time that never happened.

Someone once said that nostalgia is the most useless of human emotions, and I think that applies to serious play.

This is its symbol. This is Tsubasa dining. It reminds me of those breezy summer days in the 20's when we dined somewhere in the wing of an airplane in France. You can't see it very well here, but Hemingway is reading a few pages of his new novel to Fitzgerald and Ford Madox Ford until they are blown away in the wake.

This is the South Hamptons tank polo.

Dumb rich people enjoy teasing more than anyone else. I do it a lot.

And authenticity is a major part of my serious nonsense.

I think it adds a huge amount.

For example, these are the British Mark IV tanks built in 1916.

They were armed with two machine guns, one cannon, and powered by 90 hp Ricardo engines.

They were going eight miles an hour and it was pitch black and 105 degrees inside.

And they hung canaries inside to keep the Germans out of gas.

It's a happy little story.

This is the Motor Ritz Towers in 1930s Manhattan, where I wish I had the courage to drive to the front door.

Everyone had an apartment there.

Out of sheer enthusiasm, I managed to stay on both the Zeppelin and the ocean liner.

And I love cigars - there's a cigar sign there.

And even with serious subjects like war, fake nostalgia works.

These are the great days of 1940's Battle of Britain. Just to have a Messerschmitt ME109 burst into the House of Commons and buzz around, pissing off Churchill somewhere else.

It's a nostalgic memory of the past.

Hyperbolic Overkill is a way to push exaggeration to the extreme just for fun. This is a piece I made, which was also a pamphlet. "RMS Tyrant: The Biggest Thing in the World".

The copy goes on and on for several pages, so you can't see it, but it says that the pilot's passengers can't go to their bunks until the voyage is over, and it's safe and uninsured.

Obviously modeled after the Titanic.

But it is not critical of human arrogance in the face of the elements.

It's just a disgusting, stupid joke.

Shamelessly cheap is sure to wake you up.

It makes no sense. DeSoto discovers the Mississippi River. And that's where DeSoto discovers the Mississippi River.

I did it as a simple back page. I had about four hours to write the back pages of the Lamphun. and did it. And I thought, "It's embarrassing. I hope no one knows that."

People wrote in asking for a reprint of the thing.

Urban absurdity -- that's what New Yorkers really want.

I try to make life in New York look even weirder than these covers.

I made about 40 of them, and I think 30 of them are based on that concept.

I was driving down 7th Avenue at 3am one night and this steam was pouring out of the street and I thought, 'What could it be? And who says that?

Temple of Dendur in Metropolitan New York -- It's a very gloomy place.

I wanted to make it a little jazzy and have a little fun with it.

It's a cover that doesn't look like a PC. Not New York.

I couldn't stand it any longer and received a nasty email from some environmental group saying, "This is too serious and too solemn to be made fun of. Shame on you. Apologize on your website."

I haven't embarked on that yet, but I might.

This is the word side of my brain.

(laughs) I love the term "Eurotrash."

(Laughter) So much for euro trash coming through JFK Customs.

This was a bike messenger from New York participating in the Tour de France.

If you live in New York, you know how bike messengers get around.

But he was carrying a tube to hold the blueprints and all that – we all do – and many thought it was a terrorist trying to fire rockets into the Tour de France – perhaps a modern day icon.

This is the only fashion cover I have ever done.

It's the little old lady who lives in her shoe, and this - its title was "There Goes the Neighborhood."

I don't know much about fashion. I was asked to do a so-called Mary Jane, and there was a big fight between the art director and the editor. "Take the strap" - "No, don't wear the strap" - "Take the strap - "Don't wear the strap" - it looks ugly with the logo hidden and it sucks - so in the end we sat down and did it for the reliability of the shoe.

It's a bit of a joke - the E-ZR pass. A single letter can give birth to an idea.

This is a big joke.

Audition for "King Kong".

(Laughter) People always ask me where do you get your ideas, how do you come up with them?

Truth be told, I had a terrible red wine hangover, and this thing popped into my head like Xerox in the middle of the night. All I had to do was write it down.

It was perfectly clear. I didn't think anything of it.

And when it was done, a lovely lady, an old lady named Mrs. Edgar Rosenberg - if you know the name - called me and said she really liked this cover, it was very nice.

Her previous name was Fay Lei, and it was -- I didn't have the wit to say, "Take that picture."

Finally, this is a 3 page cover that has never been done and I don't think it ever will be. A continuous page follows the cover of the magazine.

It's like a human going up an escalator, and it's divided into three parts.

Unfortunately, we can't see it all together, but if you look closely enough, you can kind of get an idea of ​​how it really starts to work.

(Applause) Very elegant. There's nothing better than a crash to end the joke. My work is now complete.

I would like to add one silly commercial. A children's book called Marvel Sandwich, coming out this fall, will bring together all the serious play so far, and will be available in good bookstores, crappy bookstores, and street tables in October.

Thank you very much.

I will introduce three projects in quick succession.

I don't have much time.

And I want to reinforce three ideas in that rapid-fire presentation.

The first is what I like to call hyper-rational processes.

It is a process that elevates rationality to an almost absurd level, transcending all the burdens normally associated with what people call a rational conclusion to something.

And it ends with what we don't really expect to be the result of rationality, as we see here.

Second, this process is unsigned.

No copyright.

The architect is particular about the existence of the author.

This requires editing, and there are teams, but the reality is that the process no longer looks like a traditional master architect sketching and his minions executing.

And the third is that this problem is challenging. In this lengthy text, it is very difficult to support the reasons that tie it all together, but it challenges highly modernist notions of flexibility.

High Modernists said we would create a kind of singular space that is common and in which almost anything can happen.

I call this "shotgun flexibility". Please turn your head over here. shoot; and must surely kill something.

So this is the promise of advanced modernism. Within a single space, practically all kinds of activities are possible.

However, as we see, operating costs are starting to make capital costs smaller in terms of design parameters.

And with this kind of idea, what happens is that what was actually in the building on opening day, or what seemed to be the most pressing need, begins to dwarf the possibility that something else might happen, and sort of subsume it.

So we propose another kind of flexibility called "compartmentalized flexibility".

And the idea is to identify a series of points in that continuum and design specifically for them.

They can be a little off-center, but in the end you actually get the original spectrum exactly as you originally expected.

With the flexibility of modernism, it doesn't really work.

What I'm about to tell you is this method of building the Seattle Central Library in five or six diagrams in front of you. This is the design process that you will see in action.

Working with library staff and the library committee, we have identified two core positions.

This is the first and shows the evolution of books and other technologies over the last 900 years.

This diagram was our kind of take on the book, and our position was that the book is technology. That's something people forget, but it's a form of technology that needs to share its primacy with other forms of technology and media that are truly powerful.

The second premise, which was very difficult for us to convince librarians at first, is that since the Carnegie library tradition began in America, libraries have a second responsibility, a social role.

Now, I will come back to this later, but in the beginning the librarians said, "No, this is not our job.

Our mission is media, especially books. ”

So what you're looking at now is actually the design of the building.

The diagram above is what we've seen in a number of modern libraries using a high degree of modernist flexibility.

Any activity can occur anywhere.

I don't know what the future holds for libraries. I don't know what the future holds for this book. So use this approach.

And what we saw was a very ordinary, even worse building - not only was it very ordinary, the reading room resembled a photocopying room, it resembled a magazine section, but it meant that the problems plaguing the library at that time had begun to engulf all the activity that was going on inside the library.

And in this case, it was these social responsibilities that were being swallowed up by the expansion of the book.

So we proposed the one in the picture below.

A very stupid approach. Just compartmentalize.

What evolution can predict does not mean that we can actually say what will happen in the future, but we do have some certainty about what will happen in the future. Put it in a specially designed box and put the unpredictable on the roof.

That was the core idea.

Now, to get this to work, I had to convince the library that the social role was just as important for the media.

What you see here is actually the program on the left.

It remains with us in all its clarity and glory.

Our first tactic was to re-digest it, give it back to them, show it and say:

Two-thirds of it is already devoted to social functions, and that's the bottom white strip, it doesn't matter what you said, it's already devoted to social functions. ”

So when we presented it to them, they agreed that this sort of core concept could work.

We have the right to return to first principles. That's the third figure.

Recombined everything.

And then we started making new decisions.

Shown on the right is the design of the library, especially in terms of square feet.

On the left side of this diagram you can see a series of five platforms (like combs, collective programs).

And to the right is a more indeterminate space. Reading rooms, etc., will evolve 20, 30, 40 years from now.

Literally that was the design of the building.

They signed it but unfortunately we came back a week later and gave this to them.

As you can see, it literally ends up in the picture on the right.

(Laughter) We just resized -- no, really, literally.

The box is on the left side of the figure.

We divided the size into 5 compartments. Very efficient.

We were able to work on a very low budget.

We put them on the site to build literal contextual relationships.

You should be able to see the water from the reading room.

The main entrance should have a public square in front of it to comply with zoning codes, etc.

You will see 5 platforms, these are the boxes.

Within each there is something very individual going on.

The areas in between are a sort of urban continuum, and their evolution cannot be predicted to the same extent.

To give you a little idea of ​​the power of this idea, the biggest block is what we call the book spiral.

It's literally a book parking lot, built in a very cheap way.

It happened to be on the 6th to 10th floor of the building, but it's not necessarily an expensive approach.

Also, the entire Dewey decimal system can be sorted out in one continuous run. No matter how it grows or shrinks within the building, there is always a clarity that ends the tear trail that everyone has experienced in public libraries.

(Laughter) And this was the last operation. It was to take these blocks that were pushed apart and hold them with the skin.

This skin also serves a double role economically.

One is the lateral stability of the entire building. it is a structural element.

But its dimensions are designed to hold all the glass, not just the structure.

I use the word impregnated glass then, but there was a layer of metal called "stretch metal".

Its metal acts as microlouvers, so the sun appears completely opaque from the outside of the building, but completely transparent from the inside.

Now, let me show you around the building.

Let's see if we can find it.

Sorry for those who get motion sickness.

So this is the building.

And I think the important thing is that when we first unveiled the building, the public saw it as entirely due to our whims and ego.

And believe it or not, it was defended by librarians.

They said, "Look, I don't know what it is, but based on the observations I've made about the program, I know that's all I need."

This goes in one of the entries.

So, obviously, it's an unusual building for a public library.

Well, now we enter the so-called living room.

This is actually the program we invented with the library.

Public libraries were recognized as the last remnants of public free space.

There are plenty of shopping malls in downtown Seattle, but not many that offer free shelter.

So it's an unprogrammed area where people can eat, scream, play chess, pretty much anything.

Now we move on to what is called the mixing chamber.

That was the main technology area within the building.

If I'm too fast for you, please let me know.

And now I'm up.

Actually, this is the place I built in this building so that I could propose to my wife.

(Laughter) She said yes.

(laughs) I'm running out of time, so I'm really going to stop.

I can show you this later.

But let's see if we can get into the book spiral right away. Because, like I said, I think this is the most unique part of the building. This is the main reading room.

Are you feeling dizzy yet?

Now, this is the spiral of the book.

So, very confusingly, it's actually a series of stairs.

This allows you to go up one floor in one city block, so you have a continuum.

Now, let's go back and work on our second project.

We're going through this very quickly.

Well, this is the Dallas Theater.

It was an unusual client for us. They came to visit us and said, 'We want you to build a new building.

We have been operating in temporary spaces for 30 years, and the temporary spaces have made us a notorious theater company.

Theater is concentrated in New York, Chicago and Seattle, with the exception of the Dallas Theater Company. ”

And the very fact that they worked in an interim space meant that walls could be blown down for Beckett. They could play "Cherry Orchard" or punch a hole in the floor.

For us, therefore, it was a very difficult task to build a brand new building that could be a natural building while maintaining this kind of experimental nature.

The second is that it is a so-called polymorphic theater, which presents different types of performances within its repertoire.

So they'll do something in the arena in the morning and then something in the proscenium or something like that.

So we needed to be able to move quickly between different theater organizations. For operating budget reasons, most multiform theaters in the United States don't really do this anymore. So we had to find a way to overcome it.

So our idea was to literally put the theater on top. What was previously defined as the front of the house and the back of the house were stacked above and below the house to create what we call the theater machine.

We will invest that money into building operations.

It's like a building that can be built anywhere, and no matter where you place it, the area underneath will cost a theater fee.

And it has allowed us to go back to our first principles and redefine fly towers, acoustic enclosures, light enclosures and more.

And with the push of a button, the Artistic Director can move between proscenium, thrust and indeed arena and traverse and flat floor in very quick transformations.

So really, with the operating budget, you can really achieve something that, sorry for the cost of capital, was no longer achievable with the cost of operation.

And that means the artistic director now has a palette to choose from among a range of forms and a range of processions. It freed up the perimeter enclosure of the theater, which was normally confined to the space in front and back of the theater.

Thus, the Artistic Director has the ability to take part in a Wagnerian procession, show the first act in a rush, show an intermission in a Greek procession, show the second act in an arena, and so on.

Now let me explain what this actually means.

You can see the theater up close here.

Virtually any part of the perimeter of the theater can be opened independently.

The lighting enclosure can be lifted separately from the acoustic enclosure so you can do Beckett with Dallas as your backdrop.

Part of it can be opened, so you can actually run a motorcycle and perform, as well as outdoor performances and performances only during breaks.

The balconies all move as they move between these configurations, but they can also disappear.

Proscenium lines can also disappear.

You can bring in huge objects, so in fact the Dallas Theater Company will try to bring in real planes, with their first show set to be a play about Charles Lindbergh.

And in the off-season, you can actually rent out your space for something else entirely.

This is what it looks like from a distance.

Open whole parts for different kinds of events.

and night.

Remove the lighting enclosure again. Keep the acoustic enclosure.

It's a monster truck show.

Introducing our final project.

I am also a rare customer.

They turned the whole concept of development upside down.

They came to visit us and said, unlike the usual developers, "We want to start by providing Louisville with a museum of contemporary art.

That's our main goal. ”

So they focused on downtown's ability to be a catalyst, rather than developers thinking about money-making opportunities.

And the fact that they wanted to support the Museum of Contemporary Art really built their pro forma, so they worked backwards.

And while that pro forma led us to a very large mixed-use building to support their art aspirations, it also opened up opportunities for art itself to collaborate and interact with commercial spaces that indeed artists increasingly want to work within.

It also tasked us with figuring out how to have both single buildings and reliable sub-buildings.

This is the Louisville skyline. We will discuss the various constraints that led to the project.

First, there are physical constraints.

In reality, it had to operate at three separate sites, all of which were much smaller than the size of the building.

We worked next door to the new Muhammad Ali Center and had to respect that.

We had to operate in a 100-year-old floodplain.

This area now floods 3-4 times a year and we have a levee behind our property similar to the one that broke in New Orleans.

We had to operate behind Interstate 64, the street running through the middle of these separate properties.

So we're starting to build some kind of nightmare constraint inside the bathtub.

Under the bathtub are the city's main power lines.

And what they wanted to add was a pedestrian walkway that connects a series of cultural buildings, and an observation corridor that they didn't want to disturb with the new building, since this is a historic district.

(Laughter) And now we're going to add 1.1 million square feet.

And if we're traditional, with its 1.1 million square feet, these are a variety of programs. The traditional thing is to identify the public elements and place them in the premises, and now we are going to experience a really bad situation: public things placed in the middle of a flooded bathtub.

Next, size all other elements (various commercial elements such as hotels, luxury homes, offices, etc.) and place them on top.

And we will create the impossible.

In fact, as you know, it's called the Time Warner Building.

(Laughter) So, our strategy was very simple.

Simply lift entire blocks, flip some elements, reposition them for the right view and relationship to downtown, create circular connections and reroute roads.

That's the basic concept, and now I'm going to explain what it leads to.

This seems like a very formal and purposeful gesture, but it is derived entirely from constraints.

And also, when we put it out, there was a kind of tension that this was an architect making a statement, not an architect trying to solve a set of problems.

Now, within that center zone, as I said earlier, you can mix things together.

Now this is a kind of X-ray. Tower is completely developer driven.

They gave us measurements, sizes, etc. And we focused on taking all the public elements of the different commercial elements, such as lobbies and bars, and combining them into something like a subway map, in the center of the transit zone, which also includes the Museum of Contemporary Art.

This creates a situation where there are artists who can work within an art space on the 22nd floor with great views, while also being close enough for curators to open and close.

You can see people riding exercise bikes and see art.

It also means that if an artist wants to break into a place like a pool, they can start their exhibition in the pool, so they don't have to work within the confines of a contemporary gallery space all the time.

Now how to build this.

It's very simple. it's a chair

So start by building the core.

Build a modern museum on the grade while building the core.

This results in amazing efficiency and cost efficiency.

This is not a high budget building.

The moment the core reaches medium level, the museum ends. Place all mechanical equipment in it. Then jack it up in the air.

This is how you build a very large aircraft hangar made for the A380, for example.

After finishing the core and finishing the meat, it should look like this.

Since we only have about 30 seconds, we want to start the animation and let it end.

thank you.

(Applause.) Chris asked me to add. The theater is under construction and the project is expected to begin construction in about a year and be completed in 2010.

[identify public elements] [insert public elements on slope] [optimize tower dimensions] [place tower on site] [lift program] [flip!] [optimize program adjacency] [connect to context] [redirect 7th Avenue]

Some 17 years ago I developed an allergy to the air in Delhi.

Doctors told me that my lung capacity had dropped to 70% and that I would die.

Thanks to learnings from IIT, TERI, and NASA, we discovered that there are three basic green plants, or green plants in general, that we can use to grow the fresh air we need to stay healthy indoors.

We also found that we could reduce the need for fresh air inside the building while maintaining industry indoor air quality standards.

The three plants are areca palm, mother-in-law's tongue, and money plant.

The name of the plant is in front of you.

Areca palm is a plant that removes CO2 and converts it to oxygen.

You need four shoulder-high plants per person, and when it comes to plant care, you'll need to wipe the leaves daily in Delhi, perhaps once a week in cities with clean air.

They had to be grown in sterile earthworm fertilizer or hydroponically and brought outdoors every three to four months.

The second plant is mother-in-law's tongue. This is also a very common plant and we call it a bedroom plant because it converts CO2 to oxygen at night.

And you need 6-8 waist-high plants per person.

The third plant is the money plant, which is also very common. Hydroponics is preferred.

And this particular plant removes formaldehyde and other volatile chemicals.

With these three plants, you can grow all the fresh air you need.

In fact, even in a capped jar, they don't die at all and don't need fresh air.

We tested these plants in our 20-year-old 50,000-square-foot building in Delhi.

And there are nearly 1,200 such plants for 300 residents.

Our study found that staying indoors for 10 hours in this building has a 42 percent chance of increasing blood oxygen by 1 percent.

The Indian government has found or published a study showing that this is the healthiest building in New Delhi.

The study also showed a 52 percent reduction in eye irritation, a 34 percent reduction in respiratory inflammation, a 24 percent reduction in headaches, a 12 percent reduction in lung function impairment, and a 9 percent reduction in asthma incidence compared to other buildings.

The study was published on September 8, 2008 and is available on the Indian government website.

Our experience shows an amazing 20% ​​or more increase in human productivity using these plants.

Energy requirements in buildings are also significantly reduced by 15% as less fresh air is required.

We're currently replicating this in a 1.75 million square foot building with 60,000 indoor plants.

why is this important?

This is also important for the environment, as global energy demand is expected to increase by 30% over the next decade.

Buildings currently provide 40 percent of the world's energy, and in the next 15 years, 60 percent of the world's population will live in buildings in cities of one million or more.

And there is an increasing tendency to live and work in air-conditioned places.

Mahatma Gandhi said, "Make the change you want to see in the world."

And thank you for listening.

(applause)

Imagine a future where no one dies. Instead, our minds are uploaded to the digital world.

They may continue to live in realistic simulated environments with avatar bodies and be able to summon and contribute to the living world.

Mind uploading has a powerful appeal, but what does it take to actually scan a person's brain and upload their mind?

The main challenge is to scan the brain in enough detail to capture the mind, and to artificially recreate that detail perfectly.

But first you need to know what to scan.

The human brain has about 86 billion neurons, connected by at least 100 trillion synapses.

The pattern of connections between neurons in the brain, all of the neurons and their interconnections, is called the connectome.

We have yet to map the connectome, and there is much more to neural signaling.

There are hundreds, perhaps thousands, of different types of connections or synapses.

Each function is slightly different.

Some work faster, some work slower.

Some grow and shrink rapidly during the learning process. Some stabilize over time.

And beyond trillions of precise one-to-one connections between neurons, some neurons release neurotransmitters that affect many others simultaneously.

To copy a person's mind, we need to map all these different kinds of interactions.

There are also many effects on neural signaling that are poorly understood or undiscovered.

To give just one example, activity patterns between neurons can be influenced by a cell type called glia.

Glia surround neurons and, according to some scientists, may outnumber neurons by as much as 10 to 1.

Glia were once thought to be purely for structural support, and although their function is still poorly understood, at least some of them can generate their own signals that influence information processing.

Our understanding of the brain is not good enough to determine what we need to scan to recreate the mind, but assuming our knowledge is that advanced, how do we scan the brain?

Today, our best non-invasive scanning method, MRI, can be used to accurately scan the living human brain with a resolution of approximately 0.5 millimeters.

To detect synapses, you need to scan at a resolution of about 1 micron, or 1/1000th of a millimeter.

Better resolution will be required to accurately distinguish between synaptic types and the strength of each synapse.

MRI relies on strong magnetic fields.

Field strengths high enough to heat human tissue are required to scan at the resolution required to determine the details of individual synapses.

Therefore, this kind of resolution leap requires a fundamentally new scanning technique.

Scanning dead brains using electron microscopy would be more practical, but even that technology isn't good enough and the subject must first be killed.

Assuming we can finally understand the brain well enough to know what to scan, and develop a technique to safely scan it at that resolution, the next challenge will be to recreate that information digitally.

The main obstacles to doing so are computing power and storage capacity, both of which have improved over the years.

In fact, we are much closer to acquiring this technical ability than we are to understanding or scanning our own minds.

Artificial neural networks already run Internet search engines, digital assistants, self-driving cars, Wall Street trading algorithms, and smartphones.

No one has built an artificial network with 86 billion neurons yet, but as computing technology improves, it may be possible to track such massive datasets.

At each stage of the scanning and uploading process, you need to ensure that you accurately capture all the information you need. If you don't, you don't know what kind of destroyed spirit will appear.

Mind uploading is theoretically possible, but the technology and scientific understanding to make it a reality is probably hundreds of years away.

And that reality will come with ethical and philosophical considerations. Who can access Mind Upload?

What rights are given to uploaded minds?

How could this technology be abused?

Even if you could eventually upload your mind, whether or not you should do so remains an open question.

On December 7, 1941, 16-year-old Aki Kurose shared the horror of millions of Americans when Japanese planes attacked Pearl Harbor.

What she didn't know was that the shared experience would eventually alienate her family and more than 120,000 Japanese Americans from the country, both socially and physically.

By 1941, the United States had had a growing Japanese American community for over 50 years.

About a third of them are immigrants, many of whom have settled on the West Coast and lived there for decades.

The rest, like Aki, were born American citizens.

Born Akiko Kato in Seattle, Aki grew up in a diverse neighborhood and never thought of herself as anything but American until the day after the attack, when a teacher told her, "You guys bombed Pearl Harbor."

In fear of racism, paranoia, and sabotage, people labeled Japanese Americans as potential traitors.

FBI agents launched raids, seized belongings, and detained community leaders without trial.

Aki's family was not immediately subject to these extreme measures, but on February 19, 1942, President Roosevelt issued Executive Order 9066.

This order allowed the exclusion of suspected enemies, even those of partial Japanese descent, from designated "military areas." Initially, Japanese Americans were forced to leave the exclusion zone and move inland.

But as the government froze bank accounts and imposed local restrictions such as curfews, many people, including Aki's family, were unable to leave their homes.

In March, a proclamation was issued prohibiting the relocation of Japanese Americans, confining them to military zones.

In May, the military transferred Aki, her family, and more than 7,000 Japanese Americans living in Seattle to Camp Harmony in Puyallup, Washington.

It was one of several makeshift detention centers located on former amusement parks and racetracks, where entire families were crammed into crudely converted stables and barracks.

Over the next few months, the military moved Japanese Americans to long-term camps in desolate areas in the West and South, and moved Aki and her family to Minidoka, southern Idaho.

Many of these camps, guarded by armed soldiers, were still under construction when the non-internees moved in.

These hastily constructed prisons were overcrowded and unsanitary.

People fell ill frequently and did not have proper medical care.

The War Relocation Service relied on non-internees to run the camps.

Many worked in camp facilities or taught in unequipped classrooms, while others raised crops and animals.

Some Japanese Americans rebelled, organizing labor strikes and rioting.

But even more endured, like Aki's parents.

They were always trying to recreate what life was like outside the camp, but the real situation was inevitable.

Like many young detainees, Aki was determined to leave the camp.

She finished her final year of high school in Minidoka and was able to attend Friends College in Kansas with the help of an anti-racist Quaker organization.

But things didn't change for Aki's family until late 1944.

A landmark Supreme Court case ruled that the continued detention of American citizens without charge was unconstitutional.

In the fall of 1945 the war ended and the camp was closed.

The remaining internees were given only $25 and train tickets to their pre-war addresses, but many no longer had homes or jobs to return to.

Aki's family was able to keep the apartment, and Aki eventually returned to Seattle after college.

However, post-war prejudice made it difficult to find work.

Incare residents faced discrimination and resentment from the workers and tenants who replaced them.

Fortunately, Japanese Americans weren't the only ones struggling with racism.

Aki found work in one of Seattle's first interracial unions and attended the Racial Equality Congress.

She became a teacher and over the decades her advocacy for multicultural and socially conscious education has influenced thousands of students.

However, many former internees, especially the older generation, were unable to rebuild their lives after the war.

The children of internees have launched a campaign to demand that the United States make amends for this historic injustice.

In 1988, the U.S. government officially apologized for its wartime internment, acknowledging its devastating consequences of racism, hysteria, and a failure of political leadership.

Three years after this apology, Aki Kurose was awarded the Human Rights Award by the United Nations Seattle chapter, recognizing her vision for peace and respect for people of all backgrounds.

One hundred years ago, there were 2,000 varieties of peaches, about 2,000 plums, and about 800 named apples in the United States.

Today only a fraction of them remain, and those that remain are threatened by agricultural industrialization, disease and climate change.

Endangered varieties include the Blood Kling, a red-fleshed peach that was brought to the Americas by Spanish missionaries and then cultivated by Native Americans for centuries. Apricots brought by Chinese immigrants who came to work on the transcontinental railroad. And the myriad varieties of plums that originated in the Middle East and were then brought in by immigrants from Italy, France and Germany.

None of these breeds are native breeds.

In fact, almost all fruit trees were brought here: apples, peaches, cherries.

So these fruits are not just food, they have our culture embedded in them.

The people who cared for and nurtured them treasured them so much and brought them here as a connection to their homeland, and that's how they've been passing them on and sharing them.

In many ways, these fruits are our story.

And I was lucky enough to find out about it through a piece I created entitled '40 Fruit Trees'.

A 40-fruit tree is a single tree that grows 40 types of drupes.

That means peaches, plums, apricots, nectarines and cherries all on one tree.

It has pink and white flowers in spring and various fruits in summer.

I started this project for purely artistic reasons. I wanted to change the reality of everyday life. To be honest, I wanted to create this amazing moment where people see this tree blooming in different colors and bearing different fruits.

I made "40 fruit trees" in the process of grafting.

Collect and store cuttings in winter and graft onto branch tips in spring.

In fact, almost all fruit trees are grafted because the seed of the fruit tree is a genetic variant of the parent.

So when we find a variety that we really like, the way to multiply it is by cutting it from one tree and attaching it to another. It's kind of crazy to think that all McIntosh apples came from one tree that was grafted over and over from generation to generation.

But that also means that fruit trees cannot be saved by seed.

I've known about grafting for as long as I can remember.

My great-grandfather made a living grafting peach orchards in southeastern Pennsylvania.

And though I never met him, I quickly realized that he knew how to graft whenever someone mentioned his name, as if he had magical or mystical abilities.

I chose 40 as the number for 40 Fruit Trees because it is seen throughout Western religions as an uncountable number rather than a quantifiable twelve or infinity.

It's a bounty or multiple.

But the problem is, when I started, I couldn't find 40 different varieties of these fruits. This was one of the major producers of these fruits 100 years ago, despite the fact that I live in New York State.

So when they were tearing up research orchards and old vintage orchards, I would collect branches from them and graft them onto nursery trees.

Here's what the 40-fruit trees looked like when they were first planted, and what they look like 6 years later.

This is never an instant gratification sport -- (laughter) it will be a year before we know if the port is successful. It will take 2-3 years before we know if it will bear fruit. And it takes up to eight years to grow just one tree.

The cultivars grafted onto the "40 Fruit Tree" are slightly different in shape and color.

And I realized that by creating a timeline of when all of this was in bloom in relation to each other, I could basically shape and design what the tree would look like in spring.

And this is how it manifests itself during the summer.

It bears fruit from June to September.

First cherries, then apricots, Asian plums, nectarines, peaches, and I feel like I forgot one somewhere...

(Laughs) It's a work outside the gallery, but as the project progresses, conservation efforts are being made through the art world.

I have been asked to create these in various locations, so what I do is research the varieties that were originated or historically grown in the area and source them locally and graft them onto the trees so that it becomes the agricultural history of the area in which they are located.

And the project was picked up online, which was both terrifying and humbling.

What was terrifying was all the 40 fruit tree image tattoos I saw.

(Laughs) I thought, 'Why would you do that to your body?

(Laughter.) And the humble part was all the requests I received from pastors, rabbis and priests to use this tree as a center of service.

And it became a meme. The answer to that question is, "I hope not?"

[Is your marriage like 40 fruit trees?] (Laughter) Like all good memes, this led to an interview on NPR's "Weekend Edition." As a college professor, I thought I had peaked -- like it was the pinnacle of my career -- but I don't know who listens to NPR.

And a few weeks after my NPR interview, I got an email from the Department of Defense.

The Defense Advanced Research Projects Management Agency invited me to come talk about innovation and creativity, but the conversation quickly turned to discussing food security.

As you know, our national security depends on food security.

We have established monocultures growing only a few varieties of each crop, so if something happens to one of those varieties, it can have a dramatic impact on our food supply.

And the key to maintaining food security is conserving biodiversity.

A hundred years ago, this was done by everyone with a garden or small grove in their backyard, growing varieties that would be passed down in the family.

These are plums with 40 berries harvested from just one tree in one week in August.

Several years into the project, I was told that I had the largest collection of these fruits in the eastern United States. As an artist, it's really scary.

(Laughter.) But in many ways, I didn't know what I had.

It turns out that most of the varieties I had were heirloom varieties and were grown before 1945, the dawn of the industrialization of agriculture.

Some varieties date back thousands of years.

And seeing how rare they were, I became obsessed with trying to preserve them, and the means to do so became art.

I used to go before old vintage orchards were torn up to preserve pots and trunk parts where the original graft joints were.

I started making herbarium specimens by pressing flowers and leaves.

I started looking at DNA sequences.

But in the end, I decided to preserve the story through copperplate etching and typographic writing.

As I told the story of George IV peach rooted between two buildings in New York City, someone walked by and tasted it. Its delicious taste made it a major commercial variety in the 19th century.

After that, it almost disappeared because it was not shipped well and was not suitable for modern agriculture.

But I understand that it needs to be told as a story.

And telling that story has to include the experience of being able to touch, smell and taste those breeds.

So I set out to create an orchard to display these fruits to the public, with the aim of placing them in as many public places as possible.

Naturally, I started looking for an acre in New York City -- (Laughter) In retrospect, that seemed pretty ambitious, and that's probably why no one answered my calls or emails -- (Laughter) Finally, four years later, Governors Island contacted me.

So Governors Island is a former naval base that was transferred to New York City in 2000.

And all this land, just five minutes by ferry from New York, has opened up.

And they invited me to start a project we called "Open Orchard" to revive a fruit variety that hadn't been grown in New York for over a century.

The ongoing "The Open Orchard" will consist of 50 grafted trees with 200 heirloom and antique fruit varieties.

That is, these are varieties that originated or were historically grown in the area.

Varieties such as the Early Strawberry Apple, which originated on 13th and 3rd Avenues.

Since fruit trees cannot be preserved by seed, The Open Orchard acts like a living gene bank, or fruit archive.

40 Like the fruit tree, it becomes experiential. It will also be symbolic.

Most importantly, people get involved in conservation and learn more about their food.

Through Tree of 40 Fruit, we've received thousands of emails from people asking the basic question: "How do you plant a tree?"

With less than 3 percent of the population directly involved in agriculture, Open Orchard will invite people to participate in public programs and workshops to learn how to graft, grow, prune and harvest trees. Take a tour to eat fresh food and bloom flowers. Working with local chefs to learn how to use these fruits and recreate the centuries-old cuisine in which many of these varieties were specially grown.

Beyond the physical premises of the orchard, it becomes a cookbook that brings together all those recipes.

It will be a field guide that tells the characteristics and characteristics of the fruit, the origin and the story.

Having grown up on a farm, I thought I knew what farming was, but I didn't want anything to do with it.

So I became an artist -- (laughter) but I have to admit it's in my own DNA.

And I think it's not just me.

100 years ago we were much more connected to the culture, cultivation and stories of food, but we are disconnected from it.

The Open Orchard creates an opportunity not only to reconnect with this obscure past, but also to think about what the future of our food might look like.

thank you.

(applause)

If you're like me, what are you doing in San Francisco on a sunny summer weekend? Build an experimental kite-powered hydrofoil capable of speeds in excess of 30 knots.

Then you realize that the wind has incredible power and that amazing things can happen.

And one day a ship like this one will break the world speed record.

But a kite is more than just a toy like this.

Kite: A brief history and a glorious future for all children's favorite toys.

So kites are over 1,000 years old and the Chinese used them for military purposes and even to lift people.

So they knew they could carry a lot of weight on that stage.

I don't understand why this man has holes.

(Laughter.) In 1827, a man named George Pocock pioneered the practical use of kites to pull buggies in horse-drawn races in the English countryside.

And, of course, in the early days of aviation, all the great inventors of the time were pursuing aviation, including Hargreaves, Langley, and even the inventor of this kite-flying telephone, Alexander Graham Bell.

Then these two guys came along and were kite-flying to develop the control systems that would eventually allow manned, powered flight.

So this is of course Orville and Wilbur Wright and Wright Flyer.

And their kite experiments led to this momentous occasion as we powered up and took off for the first-ever 12-second manned flight.

And it was great for the future of civil aviation.

Unfortunately, however, kites have once again been treated as children's toys.

That was until the 1970s, when the last energy crisis occurred.

And then a wonderful man named Miles Lloyd, who lives outside of San Francisco, wrote this seminal paper, completely ignored by the Journal of Energy, about how to basically string an airplane together to generate an enormous amount of electricity.

The really important observation he made is that free-flying wings can fly more through the air and generate more power per unit of time than fixed-wing turbines.

So the turbine grew. And while it can now stretch up to 300 feet in hub height, it can't really go higher than that. Higher height means more wind and up to twice the power.

So cut to here. We still have an energy crisis, but now we also have a climate crisis. Humans generate about 12 trillion watts, or 12 terawatts, from fossil fuels.

And Al Gore talks about why we need to hit one of those goals, but what it really means is that over the next 30 to 40 years, we have to somehow produce over 10 trillion watts of new clean energy.

Wind power is the second largest renewable resource after solar power. Its output is 3,600 terawatts, enough to power humans 200 times more.

Most of it is at altitudes above 300 feet, and the technology to get there is still lacking.

This is the beginning of a new era for kites.

This is a flying test site on Maui.

Here's the first autonomous power generation with every child's favorite plaything.

As you can see, you need to be a robot to fly this for thousands of hours.

I feel a little nauseous.

And here we are actually generating about 10 kilowatts. That's a kite not much bigger than this piano, and probably enough to power five homes in the United States.

What's really important here is that, like the Wright brothers, we're developing control systems that allow for sustained, long flight.

And it's not bad to do it in a place like this.

So this is like a kite flying peeing in the snow, tracing your name in the sky.

And here is where we really go.

That is, it exceeds the 12 second step.

And we are working towards megawatt-scale machines that fly at 2000 feet and generate large amounts of clean electricity.

So how big are those machines?

Well, this paper plane is probably -- oops!

It should be enough to power a mobile phone.

Your Cessna will be 230 kilowatts.

Lend me your Gulfstream and I'll rip its wings off and generate megawatts.

Give me a 747 and I'll generate 6 megawatts. This exceeds today's largest wind turbines.

And the spruce goose will be a 15-megawatt wing.

That's bold, you say. Agree.

But this daring has happened many times in history.

This is a refrigerator factory that mass-produces planes for World War II.

Before World War II, it was building 1,000 planes a year.

By 1945 they were making $100,000.

This factory and 100,000 planes a year could power the entire United States in about 10 years.

So this is really the story of the bold plans of these dreamy youths. We have many too.

I am lucky enough to work with 30 of them.

And I think we need to support all the dreams of kids doing these crazy things.

thank you.

(applause)

We live on a small wet planet in the vastness of space. There, billions of years ago, single-celled life forms evolved and multiplied from the same elements as all the inanimate objects around them, emitting incredible rays of complex life.

Both animate and inanimate, microscopic and cosmic, are all governed by mathematical laws with apparently arbitrary constants.

And this raises the question: If the universe is completely governed by these laws, can't a powerful enough computer accurately simulate them?

Is our reality really an incredibly detailed simulation set by a much more advanced civilization?

This idea may sound like science fiction, but it is the subject of serious study.

Philosopher Nick Bostrom makes a convincing argument that we are likely living in simulations, and some scientists think so too.

These scientists started thinking about experimental tests to find out if our universe is a simulation.

They hypothesize what the constraints of the simulation might be and how those constraints could lead to detectable signs in the world.

Where can I look for these defects?

One idea is that running simulations can accumulate errors over time.

To correct for these errors, the simulator can adjust the natural law constants.

These changes can be very subtle. For example, certain constants measured with an accuracy of one part per million are stable for decades, so the drift should be on an even smaller scale.

However, as measurements of these constants become more accurate, subtle changes may be detected over time.

Another consideration comes from the notion that finite computing power, no matter how large, cannot simulate infinity.

If space and time were continuous, even a small part of the universe would have an infinite number of points, making it impossible to simulate with finite computing power.

Therefore, simulations must represent space and time in very small pieces.

These will be so small that they are almost imperceptible.

However, we may be able to probe them by using specific subatomic particles as probes.

The basic principles are: Smaller ones are more sensitive to disruption. Think about hitting a hole in your skateboard and truck.

All units of space-time are so small that most objects will pass through them undisturbed. Not only objects large enough to be seen with the naked eye, but also molecules, atoms, even electrons and most other elementary particles that we have discovered.

If we can discover tiny units of space-time and changing constants of natural laws, does that prove that the universe is a simulation?

No, it's just the first of many steps.

For each of these discoveries there may be alternative explanations.

And more evidence will be needed to establish the simulation hypothesis as a working theory of nature.

No matter how many tests you design, you are limited by some assumptions common to all tests.

Our current understanding of the natural world at the quantum level breaks down at the so-called Planck scale.

If the unit of space-time is on this scale, we cannot look for it with our current scientific understanding.

Smaller than what is currently observable, but larger than the Planck scale to be investigated, is still widespread.

Likewise, constant changes in natural laws could also occur very slowly, and would only be observable during the lifetime of the universe.

Therefore, they may exist even if they have gone undetected for centuries and millennia.

Also, we tend to think that if there were a space simulator, it would compute in the same way that we do, and would have similar computational limitations.

In fact, we have no way of knowing what the constraints and methods of an alien civilization are, but we have to start somewhere.

It may never be possible to prove conclusively that the universe is or is not a simulation, but we will always continue to push science forward by pursuing the question of what is the nature of reality.

After eight long days of violent sailor skirmishes and being pounded by the waves, Vainamoinen, a mighty bard and sage, as old as the world itself, has washed ashore on the remote shores of Pohjola.

Unlike his hometown of Kalevala, Pojola was a dark, frozen land ruled by the "Northern Glitch-toothed Hag" Louhi.

A cunning witch nursed Väinämöinen back to health, but demanded a reward for returning him home.

Not satisfied with mere gold and silver, Louhi wanted something that did not yet exist: sampo.

Forged from "the tip of a swan's feather," "the milk of the highest virtue," "a grain of barley," and "the wool of the finest lamb," this craft was said to be a fountain of infinite wealth.

But Vainamoinen knew that only Seppo Ilmarinen, the Eternal Hammer-hand who forged the Skydome itself, could create such an object.

So he persuaded Ruhi to send him home and bring him a blacksmith.

It wasn't an easy journey, but the bard finally returned to the Kalevala.

But Irmanen refused to go to the Dark North, the land of witches and cannibals.

However, Vainamoinen kept his word and tricked Irmanen into climbing a giant tree before summoning a violent storm to bring the blacksmith to Pohjola.

Ilmarine was well received in the north.

Louhi pampered his guests with lavish hospitality and promised to get a beautiful daughter if he could make her what she wanted.

Finally, when she asked Irmanen if he could forge Sampo, he declared that this mighty blacksmith could certainly get the job done.

But no matter how hard he tried to bend the forge to his will, the fire only produced other artifacts—beautiful to look at but nasty in nature.

A bloodthirsty elegant crossbow, a glowing plow that ravaged the fields, and more.

Finally, Ilmarinen himself summoned the wind to move the bellows, and after three days pulled the sampos with their variously colored lids from the flames of the furnace.

On its sides blacksmiths have carefully crafted grain mills, salt mills and money mills.

Louhi was so pleased with the object's limitless productivity that he fled to lock the treasure up in the mountains.

However, when Irmanen tried to take his prize, the promised maiden refused to marry him and the blacksmith had to return home alone.

Years passed and Pohjola prospered, but Ilmarinen and Väinämöinen had neither wives nor great wealth.

Confused by this injustice, the bard suggested a journey to reclaim Sampo, and the two headed north with the help of Lemminkäinen. Lemminkäinen was a beautiful young man with a history of trouble.

Upon arrival, Väinämoinen demanded half of Sampo's profits as compensation. Otherwise, they would take the relics by force of arms.

Infuriated by this request, Louhi mustered an army to fight the heroes.

However, as her army prepares for war, the bard plays a magical harp, the kantele, enchanting all who hear it and causing Pojola to fall into a deep sleep.

The three men picked up the sampos unhindered and quietly fled.

Lemminkäinen was overjoyed at their success and demanded that Väinämöinen sing the victory.

The bard, knowing the danger of celebrating too early, declined.

However, after three days of travel, Lemminkäinen's excitement overwhelmed him and he recklessly began singing the song.

His terrible singing awakened nearby cranes, and his screech aroused hordes of Pojolan.

The army gave chase.

As their warship approached, Väinämöinen lifted rocks to destroy the hull.

Undeterred, Louhi transformed into a giant eagle and attacked the ships of the heroes with his army on his back.

She managed to grab Sampo with her claws, but just as quickly she fell into the sea, shattered into pieces, and sank too deep for her claws to reach.

The remains of this powerful device were buried on the ocean floor and remained in the realm of the water god Ahti, where to this day they grind salt for the sea.

(Fishing cat impersonation) This is my fishing cat impersonation, but it actually looks like this.

(Fishing cat meows recorded) A cat who loves water, loves to fish, and lives in the swamps and mangrove forests of South and Southeast Asia, some of the most unique and precious ecosystems on earth.

Isn't their fishing the best?

(Laughter) Fishing cats are one of about 40 species of wildcats.

Like tigers and lions, only much smaller.

They are probably about twice the size of our average domestic cat.

In Indonesia, people call them "Kuching Bakau". It literally means "mangrove cat".

But I like to call them mangrove tigers.

Now, we don't know as much about fishing cats as tigers, but what we've learned is that these felines are workhorses for globally important ecosystems and can be visual prey on powerful leashes for protection.

Are you crazy yet?

(Laughter) Like many endangered species, fishing cats are threatened by habitat loss. The main drivers are the international demand for farmed fish and shrimp and the deforestation of nearly half of South and Southeast Asia's historic mangrove forests.

On the other hand, mangroves are more than just a habitat for fishing cats.

It is home to an amazing variety of animals including jackals, turtles, waders and otters.

(Laughter) Mangroves also prevent soil erosion and are the first line of defense against storm surges, tsunamis and the daily survival of millions of people who live next to these forests.

More importantly, mangroves can store 5 to 10 times more carbon dioxide than tropical forests.

Therefore, protecting 1 acre of mangroves may be equivalent to protecting 5 or more acres of tropical forest.

Would you like to eliminate your lifetime carbon footprint?

Well, mangroves offer the best benefits for conservation efforts.

Deforestation, extinction and climate change are all global problems that can be solved by adding value to our species and ecosystems and working with the locals who live next door.

This is one of the three coastal deltas of South India, where communities have come together to change the face of the planet and, in some cases, its destiny.

With international support, in less than a decade, the State Forest Department and local communities worked together to restore over 20,000 acres of non-productive fish and shrimp farms to mangrove forests.

Who did you find in this restored mangrove forest about five years ago?

Sharing these fishing cat images with locals helped build their pride in globally respected endangered species and backyard ecosystems.

Also, we were able to build trusting relationships with some people and help them earn alternative livelihoods.

Santosh is a 19 year old boy. Not only has he become a conservation expert after working with us for over a year, but he has also engaged many local fishermen in their research and conservation of fishing cats.

Meet Moshi, the tribe's poacher. Not only did he stop hunting and become one of our most respected conservationists, he also used his traditional knowledge to educate an entire community to stop hunting fishing cats, otters and many other endangered species that live in backyard mangroves.

Fish and shrimp farmers like Venkat are now actively working with us conservationists to test sustainable harvesting of ecosystem services such as crabs and possibly honey from mangroves.

Incentives to protect and plant mangroves where mangroves have been lost.

A win-win-win for fishing cats, locals and the international community.

These stories show how fishing cats and lost mangrove forests can all be part of a future where fishing cats and lost mangrove forests are protected and restored by the fishermen themselves, producing carbon sinks that help offset our ecological footprint.

A fishing cat may be small, but we hope we can help make it a big deal.

Something we can all invest in to sustain life on earth a little longer.

Or our friend here might say...

(Recorded sound of fishing cat) Thank you.

(applause)

I sit at the bar with a few friends, literally couples, couples.

They are the parents of two young children, seven degrees between them, big geeks, very nice people, but very sleep deprived.

And they ask me questions that I get asked more than any other.

"So, Emily, how do couples maintain strong sexual ties over decades?" they say.

I'm a sex educator, so my friends ask me questions like this, and I'm a big nerd just like them.

I love science so I can give you something like an answer.

In fact, research has pretty solid evidence that couples who maintain strong sexual ties over decades have two things in common.

Before I tell my friends what these two things are, I have to tell them some things that are different.

These are not couples who have sex often.

Few of us have sex often.

we are busy

Nor are they necessarily a couple having wild, adventurous sex.

In fact, one recent study found that for couples who were most strongly predictive of high sexual and relationship satisfaction, the best predictor was whether they hugged after sex, rather than what kind of sex they had, how often, or where.

And they aren't necessarily a couple that doesn't want to let go of each other.

Some of them are.

They experience what researchers call "spontaneous cravings," which seem to come right out of the blue.

Cartoonist Erika Moen, who illustrated my book, portrays spontaneous desire as a lightning bolt to the genitalia. -- You suddenly want it.

It's one of the perfectly normal and healthy ways to experience sexual desire.

But there is another healthy way to experience sexual desire.

It's called "responsive needs".

Where voluntary desires appear to appear in anticipation of pleasure, reactive desires appear in response to pleasure.

There is a sex therapist in New Jersey named Christine Hyde. She gave me this wonderful metaphor she uses with her clients.

Imagine your best friend inviting you to a party, she says.

Because it's your best friend and your party.

But as the date approaches, you start thinking, "Oh, there's going to be this much traffic."

We have to find a nursery school.

Do you really want to dress up for a party and go there for the weekend? ”

But what happens when you show up at a party dressed for the party?

You are having a great time at the party.

If you're having fun at parties, that's right.

It's the same thing when it comes to sexual relations.

Get dressed for the party, get ready for the baby, put yourself on the bed, and let your partner touch your skin so your body wakes up and reminds you, "Oh yeah! I love this."

I like this person! ”

It is the desire to respond and is key to understanding couples who maintain a strong sexual connection over the long term. Because this is the part where I tell my friends two characteristics of couples who maintain a strong sexual connection. One is that there is a strong friendship at the foundation of their relationship.

Specifically, it means having a strong trust.

Relationship researcher, therapist, and developer of emotion-focused therapies, Sue Johnson, summarizes trust as: "Are you there for me?"

In particular, are you emotionally present and available to me?

Friends exist for each other.

one.

The second characteristic is to prioritize sex.

They decide it's important to their relationship.

They choose to put aside all other things they have to do—children they may have to raise, jobs they may have, other family matters they should pay attention to, other friends they may want to spend time with.

God forbid they just want to watch TV and sleep.

Forget all that and create a protected space where you can just lay down on your bed and touch your partner's skin.

In other words, best friends should prioritize sex.

So I said to my friend at the bar,

I said, best friends, make sex a priority, we talked about parties, you said you put your skin next to your partner's skin.

Then one of the partners I was talking to said "Ah."

(Laughter.) And I thought, "Well, then you have a problem."

(Laughter) The problem wasn't necessarily that they didn't want to go to the party.

If the problem is simply a lack of spontaneous desire to party, you know what to do. Wear your party clothes and show up at the party.

If you're having fun at parties, that's right.

Their difficulty was that she didn't like what this party could eat, that the music wasn't her favorite music, and that she wasn't entirely sure if she was feeling great about her relationship with the people at the party.

And this happens all the time. Good people who love each other become afraid of sex.

If these couples seek sex therapy, the therapist might tell them to stand and keep as much distance between their bodies as they need to feel comfortable, leaving 6 feet of space for the uninterested partner.

And the real difficulty is that the space is not empty.

"You don't listen to me," "I don't know what's wrong with me, but your criticism doesn't help," "If you loved me, you would," "You're not there for me," go on for weeks, months, or longer.

Perhaps you have been experiencing these difficult feelings for years.

In this book I use a really silly metaphor for this difficult emotion of raising a sleepy hedgehog until he finds a way to set it free by turning to him with kindness and compassion.

And couples struggling to maintain a strong sexual connection, the distance between them is swarming with these sleepy hedgehogs.

And that happens in any long lasting relationship.

You, too, are growing a sleepy hedgehog-like thorn between you and that special someone.

The difference between couples who maintain a strong sexual connection and those who do not is not that they do not experience these difficult and hurtful feelings, but that they are able to face those difficult feelings with kindness and compassion and find ways to release them and return to each other.

So my friends at the bar face questions like, instead of "How can I maintain a strong connection?"

But, "How can I get it back?"

And yes, there is science to answer this question, but one thing I've learned in my 25 years as a sex educator, Emily, is that there are more hedgehogs than science.

So I told them about me.

I spent months writing a book about the science of female sexual well-being.

I was thinking about sex all day every day and I was so stressed out by the project and I was zero, zero! -- Interested in actually having sex.

Then I spent months traveling around, talking to people who would listen to me about the science of female sexual well-being.

And by the time I got home, I showed up at the party, laying my body on the bed, skin touching my partner's skin. And sometimes I was so exhausted and overwhelmed that I just cried myself to sleep.

And the months of isolation increased fear, loneliness, and frustration.

lots of hedgehogs.

My best friend, this person I love and respect, felt like a million miles away.

but ...

he was still there for me.

No matter how painful his feelings were, he approached them with kindness and compassion.

He never turned his back.

And what was the second characteristic of couples who maintained a strong sexual connection?

They prioritize sex.

They decide it's important to their relationship and decide to do what it takes to get it back.

I shared the words of sex therapist and researcher Peggy Kleinplatz with a friend.

She asks: what kind of sex is worth wanting?

My partner and I observed the quality of connection and what it brought to our lives, and turned to the sleepy family of hedgehogs I introduced into our home.

And we decided it was worth it.

We decided -- we chose -- to do whatever it took to find our way, turning with kindness and compassion toward each of the sleepy hedgehogs, their painful and hurt feelings, and set them free so that we could find our way back to the connections that were important to our relationship.

This is not the story we are usually told about how sexual desire works in long-term relationships.

But even after bringing all these difficult feelings into our relationship, there is nothing more romantic or sexy than being singled out as a priority because that connection is important enough.

How can I maintain a strong sexual relationship for the long term?

You keep looking into your best friend's eyes and choosing to find your way back.

thank you.

(applause)

I have been working on poverty issues for over 20 years, and ironically the question and question I grapple with the most is how do we actually define poverty? what do you mean?

A lot of the time we're looking at the value base, i.e. if people earn less than $1 or $2-$3 a day.

But the complexity of poverty requires considering income as only one variable.

Because in reality it is a condition of choice, not freedom.

And I had an experience that really deepened and clarified my understanding.

It was Kenya and I would like to share with you.

I was in the slums of Matale Valley with my friend photographer Susan Maceras.

The Matale Valley is now one of the oldest slums in Africa.

It is about five miles from Nairobi, a mile long and about two-tenths of a mile wide, and more than half a million people have lived, for generations, crammed into this tiny tin shack, renting it, often with eight or ten people per room.

And it is also known as a place where it is difficult to grow up, such as prostitution, violence and drugs.

And as you walk through the narrow streets, you can't help but step on the raw sewage and garbage by the small houses.

But at the same time, I couldn't help but feel the human vitality, aspirations and ambitions of the people who lived there. Women washing babies, washing and drying clothes.

I met a woman named Mama Rose. She has rented the small tin shack for 32 years, where she lives with her seven children.

Four sleep in one twin bed and three sleep on mud and linoleum floors.

And she keeps her students at school by selling water at the kiosk and soap and bread at the little shop inside.

This day was also the day after the inauguration ceremony, and I was reminded how Matale is still connected to the earth.

When he sees children on the street, he says, "Obama, he's our brother!"

And I said, "Obama is my brother, so you will be my brother."

And they looked puzzled and said, "High five!"

And here I met Jane.

I was immediately struck by her kindness and kindness and asked to hear her story.

She started by telling me her dream. “I had two,” she said.

My first dream was to become a doctor. And my second dream was to marry a good man who would stay with me and my family. My mother was a single mother and could not afford to pay school fees.

So I had to give up my first dream and focus on my second dream. ”

She got married at 18 and soon had a child.

When she turned 20 and found out she was pregnant with her second child, her mother died and her husband left her to marry another woman.

So she returned to Matale again, with no income, no skills, and no money.

She eventually turned to prostitution.

It wasn't organized in the way we often think of it.

She would go out into the night with a group of twenty girls looking for work, sometimes coming home with a few shillings and sometimes with nothing.

And she said, "You know, poverty wasn't that bad. It was all humiliation and embarrassment."

In 2001 her life changed.

She had a girlfriend who had heard of an organization called Jammy Bora. The organization would lend money to people, no matter how poor they were, provided they provided adequate savings.

So she spent a year saving $50 and started going into debt. And over time I was able to buy a sewing machine.

She started tailoring.

And that's what she's doing now. Enter the second-hand market and buy an old ball gown for about $3.25.

Some of them may have been given to you.

And she repurposes them with ruffles and ribbons to make these foamy confections and sell them to women for her daughter's Sweet 16 or First Communion. These life milestones people love to celebrate across the economic spectrum.

And she does a really good business. In fact, I saw her walking down the street, hawkering. Before she knew it, she was surrounded by women buying dresses.

And as I watched her sell dresses and the jewelry she made, I remembered that Jane now makes over $4 a day.

And by many definitions she is no longer poor.

But she still lives in the Matale Valley.

And she can't get out of there.

She lives with these fears, and in fact was forced to find a new hut after being forced out of her home in January during ethnic riots.

Jammy Bora understands that, and understands that when we talk about poverty we have to look at people along the entire economic spectrum.

So they used patient capital, long-term loans and investments from Acumen and other organizations to build a low-cost residential development about an hour outside central Nairobi.

And they designed it from the perspective of customers like Jane herself, advocating responsibility and accountability.

Therefore, she must provide savings of 10 percent of the total mortgage amount, or about $400.

And they match her mortgage with what she paid for the rent of the small shack.

And in the coming weeks, she will be one of the first 200 families to move into the development.

When I asked her if she was afraid of anything or missed something from Matale, she said: "What are you afraid of that you have not yet faced?

I am HIV positive. I have dealt with everything. ”

And she said, "What do I miss?

Do I miss violence and drugs? Lack of privacy?

"Are you sad that you don't know if your children will be home at the end of the day?" she said.

I said, "So what about your dreams?"

And she said, "Well, my dreams aren't quite what I thought they were when I was little.

But when I thought about it, I knew I wanted a husband, but what I really wanted was a loving family. And I love my children dearly, and they love me back. ”

“I wanted to be a doctor, but what I really wanted to be was someone who served, healed, and healed,” she said.

So I feel so blessed with everything I have that I go to HIV counseling two days a week.

And I say, "Look at me." You are not dead.

you are still alive And if you are still alive, you must serve.' And she said, 'I am not a doctor who gives medicine.

But maybe I offer them something better because I give them hope. ”

And in the midst of this economic crisis, in which many of us are often terrified, I think we are well-suited to take a cue from Jane and reach out in recognition that being poor doesn't mean being normal.

Because when systems like the ones we see around the world fail, it's an opportunity for invention and innovation.

This is an opportunity to extend our services and products to all of humanity and truly build a world where they can make decisions and choices for themselves.

I truly believe that dignity begins there.

We owe it to Jane all over the world.

And just as important, we owe it to ourselves.

thank you.

(applause)

Three surprises await Ethic when he emerges from his stagnation.

The first is a prison cell.

The second is complete amnesia.

And the third is about a mysterious stranger slipping through a window grating and getting stuck.

His name is Hedge and he's come to help Ethic save the world.

But first they have to break out of prison.

Hedge turns his hand into a lockpick and explains the challenges ahead.

Each lock in the prison works in the same unusual way.

Inside the keyhole is a red dial that can be rotated to one of 100 positions numbered 1-100.

A particular cell's key will rotate the dial to the correct position, stopping there will turn the dial green and unlock the door.

Stealing a key from a security guard is out of the question, but Hedge has a better idea.

Hedges can carry out ethical orders.

If ethics told him to take five steps, turn right, and walk another five steps, he would do just that.

However, hedging requires specific instructions.

Ethic saying "unlock" or "try all combinations" is too vague, but "turn the dial forward 5 positions" works.

Once you're out of your cell, unlock the outer door of the prison just a bit before the guards catch you.

So what instructions will Hedge be able to efficiently open the door?

Stop now and figure it out for yourself.

Before I explain the solution, I'll give you a hint.

An important programming concept that helps unlock doors is called a loop.

This is one or more instructions that the Hedge repeats a specified number of times, such as "jump up and down 100 times". Or an instruction that the hedge repeats until a condition is met (such as "Keep hopping until 7 o'clock"). Stop now and figure it out for yourself.

The first obvious thing is that we need to find a way to try all combinations until the hedge works.

What takes a little more effort is how exactly to do that.

One solution is to tell Hedge to try all combinations in succession.

Try 1 and see if it lights up.

If it turns green, open the door, if it doesn't turn green, try 2.

If that doesn't work, try 3. Keep going up to 100.

But explaining it all is a pain.

Why write over 100 lines of code when you can do the same thing in just 3 lines?

This is where loops come into play.

There are several ways to go about this.

The lock has 100 positions, so the ethics can say, "Look at the color on the dial, turn the dial forward once, repeat 100 times."

Remember where the dial turns green and have Hedge go back to that number. A loop that specifies the number of iterations like this is called a "for" loop.

But an even more efficient loop would have Hedge turn the dial one position at a time until it turns green, and as soon as it turns green, stop and have the door open.

That way, if 1 unlocks the door, you don't have to cycle through all the remaining numbers.

This is an 'until' loop because we need to perform actions until a condition is met.

Another similar approach is to turn the dial to a stop while it is still red.

This is called a "while" loop.

Let's go back to adventure.

The hedge loops through the combinations and the cell opens at 41.

Ethic and Hedge wait for the perfect moment in guard rotation to take a break.

Soon, Ethic is faced with a choice. Hide inside the mystical crystal or break through the outer door to escape.

Ethics chooses to run away.

The second door has a longer hedging time and must be rotated to 93 degrees.

However, he takes the opportunity to open it up and explain why he saved Ethic.

The world is in turmoil. Only ethics can allow robots to take over and correct the situation.

To do so, you'll need to collect three powerful artifacts that are being used for evil purposes around the world.

Only then can Ethics return to the machine of the world, that giant crystal, and set things right.

Ethic may have escaped prison...but what has she fallen into?

The Earth is 4.6 billion years old, but most humans live less than 100 years.

So why be interested in the history of the Earth when the distant past seems so insignificant to everyday life?

As far as we know, Earth is the only planet in the solar system known to have given birth to life, and the only planet capable of providing life support for mankind.

So why Earth?

We know that the Earth is unique in having plate tectonics, liquid water on its surface, and an oxygen-rich atmosphere.

However, this was not always the case. We know this because ancient rocks document pivotal moments in Earth's planetary evolution.

And one of the best places to see these ancient rock formations is the Pilbara in Western Australia.

The rocks here are 3.5 billion years old and contain some of the oldest evidence of life on Earth.

Now, when we think of early life, we often think of stegosaurus and land-crawling fish.

But the early life I am talking about is simple microscopic life like bacteria.

And its fossils are often preserved as layered rock structures called stromatolites.

This simple form of life is nearly all we see in the fossil record for the first three billion years of life on Earth.

Our species can only be traced back a few hundred thousand years in the fossil record.

The fossil record shows that bacterial life had a strong foothold by about 3.5 to 4 billion years ago.

Rocks older than this have been destroyed or have been significantly deformed by plate tectonics.

So what remains the missing piece of the puzzle is when and how exactly life on Earth began.

Here too, the Pilbara's ancient volcanic landscape remains.

Little did I know that our work here would provide new clues to the mystery of the origin of life.

Towards the end of a full week-long mapping project, on my first field trip here, I encountered something rather special.

Now, what probably looks like a bunch of wrinkled old rocks is actually stromatolite.

And in the center of this mound was a strange little rock the size of a child's palm.

It took six months before the rock was examined under a microscope. Malcolm Walter, one of my mentors at the time, suggested that the rock resembled a geyser.

Geysers are rocks that form only on and around the rims of hot spring pools.

Now, to understand the importance of geysers, we need to go back a few centuries.

In 1871, Charles Darwin, in a letter to his friend Joseph Hooker, suggested, "What if life began in a small warm pond, and chemicals of all kinds were still ready to undergo more complex changes?"

Well, we know a little warm pond. We call them "hot springs".

In such environments, hot water is dissolving minerals in the underlying rocks.

Researchers have shown that when this solution is mixed with organic compounds, it forms a kind of chemical factory that can produce the simple cellular structures that are the first steps toward life.

However, 100 years after Darwin's letter, deep-sea hydrothermal vents, or hot vents, were discovered in the ocean.

And these are also chemical factories.

This mountain is located along the Tonga Volcanic Arc at 1,100 meters above sea level in the Pacific Ocean.

The black smoke that rises from these chimney-like structures is also mineral-rich fluid that bacteria feed on.

And since the discovery of these deep-sea vents, the favorable scenario for the origin of life has been in the ocean.

There are good reasons for this. Deep-sea vents are well known in the ancient rock record, and early Earth is thought to have had oceans all over the globe and very little surface.

Thus, the possibility of an abundance of deep-sea vents on the very early Earth is well consistent with the origin of life in the ocean.

but ...

Our research at the Pilbara provides and supports another perspective.

After three years, we were finally able to show that our little rock is indeed a geyser.

Thus, this conclusion not only suggested the presence of hot springs in the Pilbara's 3.5 billion-year-old volcano, but also delayed evidence of terrestrial life in hot springs in the Earth's geological record by 3 billion years.

Therefore, from a geological point of view, Darwin's warm small ponds are plausible candidates for the origin of life.

Of course, how life began on Earth is still, and probably will continue to be, debated.

But it is clear that it is thriving. It is diversifying and becoming more and more complex.

In time, it is a species that has reached the age of humans and has begun to question its own existence and the existence of life elsewhere. Is there a universal community waiting to connect with us, or are we all that exists?

Clues for this puzzle also come from ancient rock records.

About 2.5 billion years ago, there is evidence that bacteria began producing oxygen, much like plants do today.

Geologists call the period that followed the Great Oxidation Event.

This is implied by rocks called banded iron beds, many of which can be observed as rock masses hundreds of meters thick outcropping valleys through Karijini National Park in Western Australia.

The advent of free oxygen caused two major changes on Earth.

First, it allowed the evolution of complex life.

As you know, life needs oxygen to be big and complex.

It creates the ozone layer and protects modern life from the harmful effects of the sun's UVB radiation.

So, ironically, microbial life gave way to complex life, essentially giving up three billion years of dominance on Earth.

Today, we humans mine complex fossilized life forms and burn them for fuel.

With this act, huge amounts of carbon dioxide are released into the atmosphere, and like our microbial ancestors, we are beginning to make major changes to our planet.

And those effects are also included in global warming.

Unfortunately, the ironic development here could spell the end of humanity.

And perhaps the reason we don't connect with life elsewhere, with intelligent life elsewhere, is that as soon as it evolves, it disappears.

I think if rocks could talk, they might say, "Life on Earth is precious."

It is the product of some four billion years of delicate and complex co-evolution between life and Earth, of which humans are only the last part.

This information can be used as a guide, a prediction, or an explanation as to why this part of the galaxy looks so lonely.

But use it to gain some perspective on the legacy you want to leave on this earth you call home.

thank you.

(applause)

For thousands of years, people in England have used bronze to make tools and jewelry, and as a currency of trade.

Around 800 BC, however, things began to change. The declining value of bronze caused social turmoil and an economic crisis, what we would today call a recession.

What caused the recession?

This question has long been the subject of intense debate among economists, and for good reason.

A recession can be a mild decline in single-country economic activity lasting several months, a prolonged recession with global consequences lasting several years, or something in between.

Further complicating matters is the myriad of variables that contribute to economic health, making it difficult to pinpoint specific causes.

So it helps to start with the big picture. A recession occurs when there is a negative disruption to the balance of supply and demand.

There is a mismatch between the number of goods people want to buy, the number of goods and services that producers can offer, and the price of goods and services sold, which causes economic decline.

The relationship between supply and demand in an economy is reflected in inflation and interest rates.

Inflation occurs when the price of goods and services increases.

In other words, it reduces the value of your money.

That said, inflation is not necessarily a bad thing.

In fact, low inflation is believed to encourage economic activity.

However, high inflation without high demand can cause problems for the economy and eventually lead to a recession.

Interest rates, on the other hand, reflect the cost of borrowing for individuals and businesses.

This interest rate is usually the annual rate on the loan that the borrower pays to the creditor until the loan is repaid.

Low interest rates mean businesses can afford to borrow more money and invest it in more projects.

On the other hand, high interest rates increase costs for producers and consumers and slow down economic activity.

Fluctuations in inflation and interest rates give us an idea of ​​the health of the economy, but what causes these fluctuations in the first place?

The most obvious causes are shocks such as natural disasters, wars and geopolitical factors.

For example, an earthquake can destroy the infrastructure necessary for the production of vital commodities such as oil.

This will force the supply side of the economy to raise prices for products that use oil, reducing demand and potentially triggering a recession.

But even when the economy is thriving, recessions can occur, perhaps because of economic prosperity.

Some economists believe that expanding markets can sometimes lead to unsustainable levels of corporate activity.

For example, businesses and consumers may borrow more money on the assumption that economic growth will help them cope with the additional burden.

But if the economy doesn't grow as fast as expected, it can end up with unmanageable debt.

To pay it back, we need to divert funds from other activities and reduce our business activities.

Psychology can also contribute to depression.

When recession fears push people back from investing and spending, it can be a self-fulfilling prophecy.

In response, producers may cut operating costs to weather the expected drop in demand.

Cost cuts could eventually lead to lower wages, further reducing demand, creating a vicious cycle.

Policies aimed at preventing recessions may also contribute.

In tough times, governments and central banks may print money, increase spending, and cut central bank interest rates.

Smaller financial institutions can cut interest rates, effectively “cheap” debt and spend more.

However, these policies are not sustainable and will eventually have to be reversed to prevent excessive inflation.

If people rely too much on cheap debt or government stimulus, it can trigger an economic recession.

Britain's Bronze Depression eventually ended as the adoption of iron revolutionized agriculture and food production.

Modern markets have become more complex, making it much more difficult to weather today's recession.

But each recession provides new data that can help us more effectively predict and respond to future recessions.

"Abandon all hope, ye who enter here..." These ominous words inscribed above the gates of Hell warn Dante of dark tidings as he begins his descent into Hell.

But despite the grim atmosphere, this prophecy sets in motion perhaps the greatest love story ever told. An epic journey involving both humans and gods.

But for Dante to reach merciful salvation, he must first find his way through Hell.

This torture scene is the setting for Inferno, the first of a three-part narrative poem written by Dante Alighieri in the 14th century.

Disguised as the protagonist, Dante travels deeper and deeper into the abyss of Hell, witnessing a different and despicable punishment in each of the nine realms.

Beginning in Limbo, he travels through the circles of greed, gluttony, greed, anger, heresy, violence and deceit to the dreaded ninth circle of betrayal. There, sinners are locked up under Satan's own guard.

The next two parts, "Purgatory" and "Paradise", continue Dante's journey up the mountain of Purgatory and up the nine spheres of Heaven.

Written over ten years, these three sections form the Divine Comedy, an allegorical imagining of the soul's journey toward God.

But Dante's Divine Comedy is more than just a religious allegory.

It is also a witty and poignant commentary on Italian politics.

Dante, a soldier and politician from Florence, was loyal to God but often critical of the Roman Catholic Church.

He particularly disliked Simonyi's practice of rampant nepotism and the buying and selling of religious benefits such as the remission of sins.

Many groups took advantage of these corrupt practices, but few supported them more than the Gelfineri (Black Guelphs).

This was a political and religious faction that sought to expand the pope's political influence.

Dante was a member of the Guelph Bianchi, or White Guelphs, who believed that Florence needed further freedom from Roman influence.

As the official representative of the White Guelves, Dante frequently spoke out against papal power until 1302 when the Black Guelves used their position to banish Dante from Florence.

But far from silencing Dante, this lifelong exile led to Dante's greatest criticism.

Disgraced and with little hope of reinstatement, the author freely voiced his dissatisfaction with the church and Italian society.

Dante, who wrote The Divine Comedy in Italian rather than the traditional Latin of the educated elite, ensured the widest possible audience for his biting political commentary.

In the Wrath Circle "Inferno", Dante eagerly witnesses the sinners ripping off Black Guelph Filippo Argenti's limbs.

In the Circle of Fraud, Dante converses with a mysterious sinner who burns in the hottest flames of the Circle.

Upon learning that he was Pope Nicholas III, he told Dante that if two of his heirs died, he would become his heir - all three guilty of fraud and corruption.

Despite the dark and sometimes violent imagery of "Inferno," "Divine Comedy" is also a love story.

Dante had an arranged marriage to the daughter of a powerful Florentine family, but from the age of nine he had a crush on another woman, Beatrice Portinari.

Despite reportedly meeting only twice, she became Dante's lifelong muse, the inspiration and subject of many of his works.

In fact, it is Beatrice who initiates a daring journey into the pits of hell and the terraces of Purgatory Mountain.

Depicted as a powerful celestial figure, she guides Dante through the concentric celestial spheres of "Paradiso" until he finally comes face-to-face with God.

In the centuries since its publication, the Divine Comedy's themes of love, sin and redemption have been embraced by numerous artists, from Auguste Rodin and Salvador Dali to Ezra Pound and Neil Gaiman.

And the poet himself belatedly received salvation in 2008, when the city of Florence finally canceled Dante's antiquated exile.

I am the Weekly Technology Critic for The New York Times.

I review gadgets.

And most of what a good father should do at this time of year is to cuddle with his children and decorate the Christmas tree.

A big part of what I'm doing this year is appearing on cable TV and answering the same question, "What are the tech trends for next year?"

"Didn't you just go through something like this last year?"

But I'm going to pick the one that interests me the most. It's the perfect fusion of mobile phones and the Internet.

I found that volcano on Google Images, but didn't realize how much it resembled me to the cover of Dianetics.

(Laughter) Anyway, this all started a few years ago when they started getting your voice across the internet instead of phone lines, and we've come a long way since then.

But that in itself was interesting. This is a company like Vonage.

You basically take a regular phone, plug it into this little box, and plug that box into your cable modem.

Now it works just like a normal phone.

You get a dial tone when you pick up the phone, but it's just fake. This is a dial tone WAV file to reassure you that the world isn't over yet.

It can be anything. It can be salsa music or comedy.

Your phone number is written on the small box.

This is really great. Take this to London or Siberia and your phone will ring when your neighbor dials your house number. Because this box has it all.

It's just software that adds new features, so it has all the features that humans know about.

And Voice Over IP -- I hate that term -- Voice Over Internet -- has caused landline home phone service to drop 30% in the last three years.

In other words, self-respecting college students no longer have phone service at home.

This tends to be common among college students. Skype is the most popular VOIP service in the world.

It's a free program that you download to your Mac or PC that allows you to make free calls anywhere in the world. The downside is that you have to wear a headset like a geek.

It's not your phone - it's your computer.

But still, if you're in college and don't have money, believe me, it's better than trying to use your cell phone.

It's really cute to see a middle aged like me try Skype for the first time. Usually when a child goes abroad for a semester.

They don't want to pay international rates, so it's like, "Timmy, is that you?"

(laughs) It's really cute.

But I think -- at least when I do -- (laughter) VOIP really gets interesting when mobile phones start to have it.

Imagine you have a regular cell phone and you are at a wireless hotspot. Call anywhere in the world for free and never pay a dime to your mobile operator.

That's really, really great. However, five years after the technology has been available, there are incredibly few standard cell phones offered by US carriers with free VOIP.

I don't understand why!

(Laughter) Actually, I need to update it. I have one now.

And it was very interesting, so I thought I'd talk about it.

Coming from T-Mobile.

And I have not received payment from T-Mobile.

Not connected to T-Mobile.

The New York Times has a very strict policy on that.

Ever since we all messed up because of that Jason Blair.

(Laughter) Basically, the reason you've never heard of this program is that it was introduced on June 29th of last year.

Does anyone remember what else happened last June 29th?

It was an iPhone. The iPhone was launched on that day.

Can you imagine being a PR lady for T-Mobile?

"Hey, I have news for you—wow!!!"

(laughs) But it's actually really, really cool. You can choose your phone, but we're not talking about smartphones here. A regular phone such as a Blackberry with Wi-Fi.

The deal is that all calls are free whenever you're at a Wi-Fi hotspot.

Access your regular cellular network when you're outside the hotspot.

You may be thinking, "How often am I in a hotspot?"

The answer is "Anytime!"

Because they provide a regular wireless router for your home that works in conjunction with your phone.

We all know T-Mobile is the most pathetic carrier, so this is really original.

Covers about the size of my thumbnail.

(Laughter.) But it costs $100 million to build those towers. right?

They don't have that kind of money. Instead, they give each of us a box of $7.95. It's like a stealth tower installation program.

We keep it home for them!

Anyway, Europe has Wi-Fi phones.

But what T-Mobile has never done before is when you move from Wi-Fi to cellular range during a call, the call seamlessly handoffs mid-syllable. We'll show you the advanced technology the New York Times uses to test this device.

Here's what I'm doing with my video camera attached to my cell phone.

(Laughter) While I'm on the phone with my wife, look at the top left as I leave the house from the Wi-Fi hotspot and enter the cellular network. That's the Wi-Fi signal.

(Video): Jennifer Pogue: Hello?

David Pogue: Hello everyone, it's me.

JP: Oh, hi, darling, how are you?

DP: You're connected to Wi-Fi. how does that sound?

JP: Oh, that's pretty good.

I'm leaving home now. DP: I'm going for a walk--are you sure?

JP: No, not at all. I am having a great day with my children.

DP: What are you guys doing?

Right there!

It just switched to a cell phone tower during a call.

I don't understand why my wife says she doesn't listen to me. I don't know.

(Laughter) The bottom line is that with the Internet and mobile phones, boundaries are melting.

The great thing about T-Mobile phones is that while switching technology is so advanced, billing technology has not caught up.

So what I'm saying is that you can start a call on your Wi-Fi hotspot at home, and you can get in the car and talk until the battery dies (10 minutes or so) (laughter) and the calls are still free.

because they don't. not so soon

It works the other way around too.

So if you start a call on the cellular network and go home, you will continue to be charged.

Because of this, most people who use this service are accustomed to saying, "I just got home. Can I call you now?"

Now I understand.

It's also true that when you use these phones abroad, you don't know which internet hotspot you're on.

No one on the internet knows you're a dog, right? No one knows you are in Pakistan.

These phones allow you to make free, unlimited calls within the United States. Very, very interesting.

This is my favorite too.

Is there anyone here who has a cell phone that works and works and can make a call right now without too much trouble?

OK. Could you call me now? [Please tell me the phone number. ] And folks, don't call me at 3am and ask me to fix your printer.

(Laughter) I have two cell phones, so it would be very weird if this worked.

You should know that you should never demo your technology in front of an audience. It's like absurdity.

This disappears. And -- oh, the ringtone is muted. Hey! wonderful.

Anyway, this also disappears. So both are ringing at the same time.

excuse me.

Hello?

oh. where are you calling from?

No, I'm not kidding. there he is thank you very much.

I didn't even know it was you - I was looking at this guy.

That's good! yes. That's right, you can stop calling now!

(laughs) Okay! I get the point.

have understood. Turn off ringtones. Everyone wants to be in action.

(Laughter) This is Grand Central at work - it's - oh my god!

(laughter) I have your phone number!

(laughter) You pay.

Grand Central is a really cool idea where you provide a new phone number and at that point all your calls will ring at the same time from that one number.

Home phone, work phone, cell phone, yacht phone (this is the EG crowd).

(Laughter) The advantage is that you never miss a call.

I think there are many people who think, "Oh, I don't want to contact you all the time."

But the nice thing is that it all happens over the internet, so you get all these really cool features. So it's like saying I want these people to be able to call me only during this time.

And I want these people to hear this greeting, "Hello Boss, I'm out to make money for both of us. Please leave a message."

And then your wife calls and says, "Hi, please leave a message."

Very customizable.

Google bought it and has been working on it for a year.

They should announce it in a public method soon.

By the way, this really bothers me.

I don't know if you are aware of this. If you call 411 on your cell phone, you will be charged $2.

Did you know that? It's an outrage.

In fact, I took a picture of a Verizon employee there.

I'll show you how to avoid that.

We use Google Cellular.

Completely free. No ads.

If you know how to send a text message, you can get the same information for free.

trying to change your life So here's what I do.

Texting the word "Google" yielded 46645 results.

The final "e" is omitted for brevity.

Anyway, let's say you need a drugstore near Chicago.

Enter "pharmacy chicago" or zip code.

After pressing the send button, within 5 seconds, we will reply with your name, address, phone number and the two nearest drugstores.

Here we come

And it's already written down. I mean, if you're driving, you don't have to do things like "umm, umm, umm."

It also supports the weather.

You can say "weather" and the name of the city you are traveling to.

And within 5 seconds, you'll get a full weather report back for that town.

I'll tell you soon about why I was in Milan.

please. And those are just the beginning.

All of these things can be texted to Google and will be sent. You guys are trying to write this down.

it's cute i have an email address Please try to hear.

It's really amazing. The only drawback is that you need to know how to send text messages. People over 40 don't know how.

So I would like to tell you something better.

This is called Google Info.

They just released a voice-activated version of the same.

This is speech recognition like you've never heard it before.

So I'm in Monterey and what do I want?

What do you want to find? Bagels. OK.

Google: Say the company, city and state.

DP: Bagel from Monterey, California.

I got a Chinese line.

(laughs) Google: Bagels in Monterey, CA.

Top 8 Results: #1, Bagel Bakery on Eldorado Street.

To select number 1, press 1 or say "Number 1".

2nd: bagel bakery, concession department.

number two. number two. two.

(Laughter.) Why would I listen to the audience?

Well anyway -- oh! please!

Google: ...a store on McClellan Street in Monterey.

I will connect you. Or say "details" or "back".

DP: He's keeping me connected! He won't even give me his phone number.

he's just connecting directly to me. It's like having a dedicated follower.

Google: Hold on.

(laughter) DP: Hi, can I have 400 in Schmeer?

No, no, just kidding, no no.

So anyway, you don't even know the number.

That's really great.

And it has incredible accuracy.

This is even more amazing. Put this on speed dial.

This allows you to ask any question by voice.

Who won the 1958 World Series?

What is the recipe for one cocktail?

It's really great - and they text you back the answer.

Tried this morning to make sure it was still alive.

"Who is the actor who played James Bond?"

They texted me "Sean Connery, George Lazenby, Roger Moore, Timothy Dalton, Pierce Brosnan, Daniel Craig."

right! Then I was trying to pretend like a valley girl.

"What word means that the sun, moon and earth are in line?"

This is to see how the recognition has turned out.

They texted me back "it's called syzygy".

I knew that because it was the word that won me the Ohio spelling bee in 1976.

A lot of people are wondering, "How in the hell am I going to make money doing this?" Here is the answer: Look at the last line.

They posted this little ad about 10 characters long.

And a lot of people want to know, "How does it work?"

How can it be so good? It feels as if there is a human on the other end of the phone. ”

Because there is!

10,000 people pay 20 cents per answer.

As you can imagine, college students and old people.

someone who can do that.

But it is humans that are at stake. And it has saved me from a lot of difficult situations like, "When is the last flight out of Chicago?"

Look. Really great.

Another thing that really bothers me about today's cell phones is that this is probably my biggest gripe in all of technology.

When you call to leave a message, your 3rd grade teacher will give you 15 seconds of instructions about Ambien.

(Laughs) "To put a page on this person..." A page? What is this, 1975?

No one has a pager anymore.

"You can start speaking in that tone.

You can hang up the phone when you are done recording. ”

(Laughter) It gets even worse. When I called to retrieve my messages, the first message I got was "You have 87 messages.

To hear your message...'Why else would you call?

(laughs) Of course I want to hear your message too!

(laughter) Oh! Everyone has a mobile phone, right?

So last year, I was able to travel to Milan, Italy, and speak to an audience of mobile operator executives from 200 countries around the world.

And I joked -- just kidding, "I did the math. Verizon has 70 million customers.

Checking voicemail twice a day is $100 million a year.

I'm sure you're doing this just to shorten the airtime, right? ”

No laughter. They're like -- (Laughter) Guys, where's the anger? stand up!

(laughs) I'm sorry. It doesn't hurt.

(laughs) So, I'm going to tell you how to get out of that.

There are services that convert voicemails to text.

Then send it to your email or send it as a text message to your mobile phone.

It's life changing.

By the way, they don't always understand the words correctly because they communicate over the phone.

So, an audio file is attached at the bottom of the email so you can listen to the reconfirmation.

These services are called Spinvox, Phonetag, etc. -- this is what I use -- Callwave. Many people say, "How do they do this?"

I don't want others to hear my calls. ”

Executives from these companies told me: “We use the best peer-to-peer solution on our own B2B.”

I think it's basically like people in India listening with headsets on.

I think so because the first day I tried one of these services, I received two voicemail messages. One of them was from someone named Michael Stevenson, and it shouldn't be too hard to copy, but it was misspelled.

The other is from my video producer for The Times, whose name is Vijaiy Singh, with an 'h' for silence. It nailed it.

(laughter) Then you will be the judge.

(Laughter) Anyway, the service Callwave promises that it's all software, meaning no one is listening to your messages.

We also promise to transcribe only the main points of the message.

(laughs) So I thought, let's see what happens.

This is what I am testing.

(Video): Hi, I'm Michael.

I hope you are well. It's fine here. All good.

Hey, when I was walking along the road, the sky was blue.

And your daughter broke her leg during soccer practice.

I'm going to eat a sandwich for lunch.

She is in room 53W in emergency room.

OK, we'll talk later -- goodbye.

(laughs) I love my job.

(Laughter) So, a few minutes later, I got this in the mail.

Very good transcription. But minutes after that, I got the text message version. Remember, text messages can be up to 160 characters long.

It should be the gist of the gist, right?

no kidding. The message said, "I was walking down the street," "the sky was blue," and "urgent!"

(laughter) What is that—?

(Laughs) Well, I think that was the point.

(Laughter) And finally, I have to talk about this.

This is my all-time favorite. It's called Popularitydialer.com.

Basically, you're going on a questionable date, or potentially a bad meeting.

So you enter a phone number and it will call you at the exact moment you want to call -- (Laughter) and at that moment the phone will ring.

And it's like, "I'm sorry, I have to take this."

What's really cool is that you can sometimes hear a little bit of the caller's voice if someone is sitting next to you.

Therefore, you will be able to choose what you want to hear on the far end.

Here is my girlfriend.

Phone: Hi, what's going on?

DP: I'm giving a little talk right now.

Phone: Well, that's good.

DP: What are you doing?

Phone: I was wondering what you were doing.

DP: Well, I can't speak much right now.

This, I love this, is a call from my boss.

Phone: Hi, Mr. Johnson is calling from his office.

DP: Oh, hi.

Phone: Was that completed about a month ago? Photocopier training?

DP: Oh -- sorry, I forgot.

Phone: Well, when was the last time you used the photocopier?

DP: That was three weeks ago.

Phone: Well, I don't know if you've heard it, but you may have heard it from Lenny -- (laughter) I think the biggest change that the Internet and phones have met was the iPhone.

It wasn't my greatest moment in New York Times journalism.

Back in the fall of 2006, I explained why Apple would never develop a mobile phone.

(Laughter) I looked like an idiot. But my logic was correct. Because, I don't know if you're aware, until the iPhone came along, carriers (Verizon, AT&T, Cingular) had veto power over every aspect of every phone's every design.

I know people who worked on Treo.

They went around these airlines and said, "Look at this amazing feature." Verizon then said, "Well, no.

i don't think so. "

It didn't encourage innovation.

What I didn't expect was Steve Jobs going around and saying,

Actually, even then, Verizon and others turned me down.

Finally Cingular gave the OK.

Talk about the impact of the iPhone.

Don't corner me at a party tonight and say, "What are you? Are you an Apple fan boy?"

- Look. it's not.

You see what I said about that. A flawed masterpiece.

There are bad things and good things. Let's all admit it now.

But it changed a few things. The first thing that changed was that all these carriers sold 10 million units of these products in one year.

And they were like, 'Oh my God, maybe we were doing it wrong.

Maybe we should leave phone design to phone designers. ”

(Applause.) The other thing is that 10 million people have an always-online experience for the first time.

I'm not using a $60/month cellular card for my laptop.

I don't understand why we haven't gotten there yet.

When I grow old, I want to say to my grandchildren: "When I was your age, I used to drive around town looking for a coffee shop if I wanted to check my email. I did!"

(Laughter) "There was a radio base station that could broadcast, yes, about 150 feet in diameter."

(Laughter) That's absurd. Power outlets are installed in each room of each building. There is running water.

what happened?

Anyway -- but this tells people what it's like.

You need to go to YouTube and type "iPhone Shuffle".

This guy made a 1 inch by 1 inch simulated video that looks like a real iPod Shuffle.

It's like, "There's only one button."

Tap to dial a random number. ”

(laughs) “Who the heck is this guy?”

(Laughter) But the other thing it did was open up the idea of ​​the app store.

Downloads directly to your mobile phone.

The game allows you to steer your car using tilt sensors.

These programs can use all the components of the iPhone, namely the touch screen.

This is the Etch-A-Sketch program, the EG 2008 theme.

do you know how to turn it off?

of course. shake it

of course. Shake like this to erase.

There are 10,000 of these programs.

This is a translation program. They speak all languages ​​of the world.

Enter what you want and the translation will appear.

This is great. Midomi.

A song is running through your head – you sing it to the song: do-do-do-do-do, da-da-da-da-da, da-dam...

OK, tap Done and it will find the song and play it for you.

know. That's insane, right?

It's Pandora. free internet radio. It's not just free internet radio. Enter the band name or song title.

Play that song or band immediately.

There are thumbs up and thumbs down.

You say you love or hate this song.

If you like it, try another song by another band with the same instrumentation, vocals, theme, and tempo.

Thumbs up or thumbs down depending on whether you like it or not. Over time, tune your tunes to stop playing bad tunes altogether.

In the end, only the songs you like will be played.

Urban Spoon. you are in the city Know where you are with GPS.

I would like to find a place to eat. shake it

Suggest a restaurant.

Prices, locations and ratings are also posted.

Video: Don't go as far as flushing.

Just amazing, amazing things.

Of course, it's not just about the iPhone.

iPhone broke levee, wall.

But now it's others. So Google has developed its own Android operating system, which will soon be in mobile phones (34 mobile phones).

Touchscreen -- Very nice.

It also has its own App Store where you can download programs.

This is great. With all this, Verizon, the most calcified, enterprising and conservative carrier of all carriers, said, "We can use any phone on our network."

I love the Wired headline. "Pigs Fly, Hell Freezes, Verizon Opens Network - No, Really."

So everything is changing. We have entered a new world of innovation where mobile phones become laptops customized to your taste.

Every mobile phone is unique. There is also software that can be added.

Can I do another one minute song? thank you.

(Applause.) In short, this is the new Apple Power Music Stand.

Only £3 or £12 with Microsoft Office installed.

(laughs) Sorry, I was mean.

This is a song I made as a music video for the New York Times website.

Hey guys, 7 hours of bliss, this video is now the #1 video on YouTube.

(To the tune of "My Way") And finally the end is near.

I'm sick to death of this old phone.

Bad sound, weak signal, smelly software.

A phone made in hell.

I heard there is something new. It's a million times more rad than my cell phone.

I also join the cult.

I want an iPhone.

Concerns -- There are several. It has some flaws. we may just face it.

No key, no memory card. The battery is sealed and cannot be replaced.

But my god, this is sweet.

Multi-touch, iPod, Wi-Fi phone.

I came from "Hello".

I want an iPhone.

I want to touch the important screen.

I want to wipe off the dirt.

I want my friends to watch and drool.

I'd like to say, "Look, I'm sober now," but I got in line, so I'll get mine.

I want an iPhone.

What are men for?

what does he have If it's not an iPhone, he's squatting.

It's everything a phone should have.

Who cares if it's AT&T?

I got up and paid half price!

And I got an iPhone!

(Applause.) Thank you. thank you very much.

(applause)

I mean...we are in a real war right now, and it's a war we're really losing.

It's a battle against super bugs.

So if you're going to talk about superbugs, you might be wondering why I'm showing you pictures of some football fans. A Liverpool football fan celebrating a famous victory in Istanbul 10 years ago.

That's me in the back in the red shirt and next to me in the red hat is my friend Paul Rice.

Years after this photo was taken, Paul was hospitalized for minor surgery, developed a Superbug-related infection, and died.

And I was really shocked.

He was in prime health.

So, in fact, with a lot of encouragement from a few TED stars, I declared my personal war on superbugs.

Now let's talk a little bit about superbugs.

The story actually begins in the 1940s, when antibiotics were widely introduced.

And since then, drug-resistant bacteria have continued to emerge, forcing us to develop new drugs to combat these new bacteria.

And this vicious cycle is actually the origin of superbugs, which are just bacteria that have no effective medicine.

I'm sure you know at least some of these superbugs.

These are more common today.

About 700,000 people died last year from superbug-related illnesses.

Looking to the future, if we continue on the path we are on, which is essentially a drug-based approach to the problem, by mid-century the best estimate for the global death toll from superbugs will be 10 million.

Ten million.

To put this in context, this actually surpassed the number of people who died of cancer worldwide last year.

So it is clear that we are not on the right track, and drug-based approaches to this problem are not working.

I'm a physicist, so I was wondering if I could take a physics-based approach, a different approach to this problem.

In that context, the first thing we know for sure is that we actually know how to kill all kinds of microbes, all kinds of viruses, all kinds of bacteria.

And it is due to UV rays.

In fact, we have known this for over 100 years.

We all know what UV rays are.

This is the part of the spectrum that contains the infrared, also visible light, and the short wavelength part of this group is the ultraviolet.

What is important here from our point of view is that UV light kills bacteria by a completely different mechanism than how drugs kill bacteria.

That said, UV light can kill drug-resistant bacteria just like it does other bacteria, and UV light is so good at killing all bugs that it's actually used a lot these days to disinfect rooms and disinfect work surfaces.

What you see here is an operating room that has been sterilized with germicidal ultraviolet light.

However, there are actually no people in this photo. And for good reason.

UV rays can actually cause health hazards, damaging skin cells, causing skin cancer, damaging eye cells, and causing eye diseases such as cataracts.

Therefore, you cannot use conventional germicidal UV light when there are people around.

And, of course, we want to sanitize mainly when people are around.

An ideal UV light would therefore be able to actually kill all bacteria, including superbugs, yet be safe for human exposure.

And indeed here is where my physics background inspired this story.

Together with our physics colleagues, we realized that there are certain wavelengths of ultraviolet radiation that should actually kill all bacteria but are safe for human exposure.

That wavelength is called far UVC light and is just the short wavelength part of the ultraviolet spectrum.

So let's see how it works.

What we're looking at here is the surface of our skin, and let's overlay some of the bacteria that live in the air above the skin.

Now let's see what happens when conventional germicidal UV light hits it.

As you know, germicidal light is very good at killing bacteria, but it can penetrate the upper layers of the skin and can damage vital cells in the skin, which can ultimately lead to skin cancer.

Now let's compare it to far UVC light. Same situation, skin and some bacteria in the air on it.

So what you're seeing now is, again, far UVC light is perfectly fine to kill bacteria, but what far UVC light can't do is penetrate our skin.

And there are solid physical reasons for that. Far UVC light is incredibly strongly absorbed by all biological substances, so it cannot travel very far.

Now, viruses and bacteria are really, really, really small, so far UV rays can certainly penetrate and kill them, but what it can't do is penetrate the skin, not even the dead cell areas at the very surface of the skin.

So far, UVC light should be able to kill bacteria, but it kills them safely.

That's the theory.

It should work and should be safe.

What about actually?

Is it really effective?

Are you really safe?

In fact, this is what our lab has been working on for the last 5-6 years, and I'm happy to say that the answer to both of these questions is a definite yes.

Yes it works, but it's safe.

So, while I'm happy to say that, it's not really a surprise to say that it's purely physics at work.

Now let's look to the future.

I'm thrilled to have a whole new, and cheap, weapon in my fight against superbugs.

For example, we see far UVC lights in the surgical operating room.

Far UVC light is visible in the food preparation area.

And in terms of stopping the spread of viruses, we see far UVC lights being used in schools to stop the spread of flu, to stop the spread of measles, and far UVC lights being used in airports and planes to stop the global spread of viruses like the H1N1 virus.

Now back to my friend Paul Rice.

He was in fact a well-known and well-loved local politician in his and my hometown of Liverpool, and a statue was erected in his memory in the center of Liverpool and it is there.

But I'm hoping that Paul's legacy will be a big step forward in the fight against this superbug.

Armed with the power of light, it is practically within our reach.

thank you.

(Applause) Chris Anderson: Stay here, David, I have a question.

(Applause.) David, please tell us how far you've come in developing this, and what are the remaining obstacles to trying to develop and make this dream a reality.

David Brenner: Well, I think we know now that it kills all germs, and we kind of knew that before we started, but we certainly tested it.

Therefore, safety has to be heavily tested, with safety over efficacy.

And it is necessary to conduct a short-term examination. Also, long-term testing should be done to ensure that melanoma does not develop over the years.

So these studies are pretty well done at the moment.

Of course, the FDA is an issue we have to deal with, and rightly so. Because you can't use this in the real world without FDA approval.

CA: Are you trying to launch in the US first, or elsewhere?

DB: In some countries, actually.

Both in Japan and America.

CA: Were you able to convince biologists and doctors that this was a safe approach?

DB: Well, as you can imagine, we all know UV light is not safe, so there is a certain skepticism.

So when someone shows up and says, "This UV light is safe," there's a wall to cross, but I think the data is there and that's what we stand for.

CA: Well, rest in peace.

This is potentially very important work.

Thank you very much for sharing this with us.

Thank you David.

(applause)

Hello.

My name is Harman. It always strikes me that the most important and impactful tsunami-like changes to our culture and society come from things we never thought would have such an impact.

I mean, as a computer scientist, I remember when Facebook was just sharing images in my dorm room, but now, depending on who you ask, it's involved in overthrowing elections.

I remember cryptocurrency and automated trading was kind of the idea of ​​automated cryptocurrency trading, online, by a few rebels in financial institutions around the world. And now they are rapidly starting to shape the way we operate.

And I'm sure you all remember the moment when one of these ideas felt like a ignorable, mocking thing and suddenly you thought, oh shit, the price of Bitcoin is like this.

Or, oh shit, guess who was elected.

The reality is, you know, from my perspective, I think we're about to run into something like that again.

And I suspect that one of the biggest, most impactful changes to how we live, how we are educated, and perhaps ultimately how we earn money is about to come from AI, space travel, and biotechnology. These are all very important inventions of the future. But I think in the next five years it will come from video games.

That's a bold claim, all right.

There are some skeptical faces in the audience.

But if you take a moment and think about what video games are already becoming in our lives today, and what even the tiniest technological advance is going to create, it starts to become more inevitable.

And I think that possibility is very shocking.

So let's think about scale for a second.

That means 2.6 billion people are already playing games.

And in reality, it's a billion times more than it was five years ago.

In the meantime, 1 billion people have increased.

No religion, no media, has ever been so widespread.

And there could be another billion more if Africa and India acquire the infrastructure to realize the full potential of the game.

But what I find really special, and this often shocks a lot of people, is the average age of gamers, guess and think.

Not 6, not 18, not 12.

I am 34 years old.

[Average age of American gamers] Older than me.

This tells us that this is no longer entertainment for children.

This is already becoming a fundamental part of our lives, like literature and other media.

One of my favorite stats is that people who started playing games in the last 15-20 years generally don't quit.

Something has changed in the way this media is organized.

More than that, it's not just a game anymore, is it?

I think you've heard some examples today, people are making money playing games.

And it's not the obvious way.

Yes, there is esports, there are prizes, and opportunities to compete and make money.

But some people make money by modding games, building in-game content, or doing in-game art.

So something on the scale of the Florentine Renaissance is happening in your child's iPhone in your living room.

and it is ignored.

Now, what's even more exciting for me is what happens next.

And when you think of games, you've probably already imagined one featuring this huge, infinite world. But the reality is that games have been deeply limited for a very long time, and those of us in the industry have tried hard to cover up with as many tricks as possible.

If you'll allow me to be a bit of a geek, my favorite metaphor is the concept of theater.

Over the past decade, games have evolved significantly in visual effects, physical immersion, and game front-ends.

But behind the scenes, the actual experiential reality of the game world remains severely limited.

Let's put that into perspective for a moment.

You can leave this theater right now, you can do graffiti, you can fight, you can fall in love.

You may actually do all these things after this, but the point is that they all have consequences.

It will ripple into reality - all of you can interact with it at the same time.

It will be persistent.

And those are qualities that are very important in making the real world real.

Well, behind the scenes of the game, there have been limits for a long time.

And the limitation is that behind the visuals, the actual information exchanged between players or entities in a single game world is deeply limited by the fact that games mostly take place on a single server or single machine.

Even World of Warcraft actually has thousands of tiny worlds.

When you hear about concerts on Fortnite, you're actually hearing about thousands of smaller concerts.

You know, an individual, like you said earlier today, a campfire or a couch.

There's really no possibility to put everything together.

Let's take a moment to really understand what that means.

Beautiful visuals, you might see all these things happening in front of you when you're watching the game.

But behind the scenes in online gaming, this is what it looks like.

To a computer scientist, all that is visible is a tiny bit of information exchanged by a few meaningful entities or objects.

You may think, "I've been playing in an infinite world."

Well, it's more than playing on the treadmill.

As you roam the world, we have expertly erased the parts of the world you weren't in and revealed the parts of the world that are right in front of you.

It's a nice trick, but it's not the basis for the revolution promised at the beginning of this talk.

But the reality is that everything is about to change, whether you're an avid gamer who's excited about this, or fearful and maybe not.

Because, finally, we've got a technology in place that goes far beyond the limits we've seen so far.

I have dedicated my career to this. Many others are working on this problem -- I can hardly credit myself, but we are now at a stage where we can finally do this impossible and difficult thing of weaving thousands of disparate machines into a single simulation. This simulation is not a one-off and is useful enough that anyone can build it.

And to be at a stage where we can begin to experience things we do not yet understand.

Let's visualize it.

I'm not talking about small individual simulations, but about the great potential of large interacting networks.

A world-scale event that can happen in it.

Even in the real world it will be difficult to produce on such a scale.

I'm sure some of you are gamers out there, so here's some footage from some partners that I'm sure is allowed.

TED and I exchanged views on this subject.

These are things that not many have seen before and new experiences powered by this kind of technology.

Let me show you a little bit of what this is all about.

It also has its own ecosystem, its own sense of predator and prey.

All objects shown here are simulated in some way.

This is a game developed by the Chinese giant NetEase, one of the largest companies in the world.

Then we created an assistant creative simulation that allows groups of players to collaborate across multiple devices in a world that never goes away.

This is the place to tell stories and have adventures.

Even the weather is simulated.

That's amazing.

And here is my personal favourite.

This is a group of pioneers from Berlin called Klang Games. they are completely insane. And they will love that I say so.

And they found a way to model basically the entire planet.

They plan to run simulations involving millions of non-player characters and players.

They actually caught Lawrence Lessig to understand the political ramifications of the world they were creating.

It's about enabling a range of amazing experiences that go far beyond what we could have imagined.

So what happens when it goes beyond that?

Well, computer science tends to progress exponentially once you solve a really hard problem.

And I'm sure that soon we'll be able to make this kind of computational power look like nothing.

And when that happens, chances are...

It's worth imagining what I'm talking about here.

Hundreds of thousands and millions of people can live together in the same space.

The last time we as a species had the opportunity to build or do something with many people was in ancient times.

And the situation was less than optimal.

Mostly conflicts and building pyramids.

It's not always the best way we spend our time.

But when you bring this many people together, you can create a wide variety of shared experiences.

I think it trains social muscles we've lost and forgotten.

Beyond that, let's take a moment to think about what it means for relationships and identities.

If we can give each other the world, a large-scale experience where we can spend our time meaningfully, we can change what it means to be an individual.

We can go beyond a single identity to reach multiple personal identities.

You may want to experiment with the gender, race, and personality traits you were born with in other ways.

You may be someone who wants to be more than one person.

We are all multiple people at heart.

We rarely get the chance to change that.

It's also about empathy.

I have a grandmother with whom I literally have nothing in common.

I love her a little bit, but her story all starts in 1940 and ends somewhere in 1950.

And every story I have is like 50 years later.

But if we can live together and experience something together, it can create opportunities together, change things, and bring people together in many ways, undiminished by physical weakness or lack of context.

I am struck by how social media amplifies our many differences and allows us to be more who we are in front of others.

I think games can really start creating opportunities for us to empathize again.

Share adversity, share opportunity.

So, statistically, at the moment, there are people on opposite sides of the conflict who are matchmade into the game together, but who don't know it.

It's a great opportunity to change the way we see things.

Finally, for those who are perhaps more cynical about all this and don't think virtual worlds or games are of any interest to them.

There are realities that must be accepted. That is, the economic impact of what I am talking about will be huge.

Soon it will be millions.

Wherever there is a mobile phone, jobs will be created.

No matter what country you're in, whatever skills and opportunities you think you have, it's an opportunity to get something creative, rich, and income-generating.

Perhaps the first thing most children born today earn is gaming.

It will be a new paperwork route and a new opportunity to earn an income early in life.

So I would like to end with almost a plea rather than a thought.

I think it's a sense that we need to approach this new opportunity a little differently than we have in the past.

It would be too hypocritical for another technologist to stand on stage and say, "The future will be great, technology will solve it."

And the reality is that this has a downside as well.

But if we again approach the opportunities this presents with cynicism and derision, those downsides will only be amplified further.

The worst we can think of is that the same 4-5 companies will dominate another adjacent space.

(Applause.) Because they're not just defining who makes money from this and how.

In reality, we are now talking about defining the way we think, the rules about identity and collaboration, the rules of the world we live in.

This must be something we all own, something we all co-create.

So my final request is to all of the engineers, scientists, and artists out there today.

Some may have dreamed of being involved in space travel.

The reality is that there is a world that can change people's lives that can be built here and now.

There are still huge technological frontiers here that need to be overcome, similar to those faced when building the early Internet.

The technology behind all virtual worlds is different.

So my request to you is this.

Let's get involved, let's all get involved, let's really try to shape this in a positive way instead of having this done to us again.

thank you.

(applause)

The King and Queen of Haiti entered the coronation ceremony to thunderous applause.

Receiving an ornate crown and scepter, Henry Christophe ascended to a throne soaring 20 meters into the air.

But little did the cheering onlookers know that Haiti's first king would be the last.

Born in Grenada, Christophe spent his childhood as a slave moving between several islands in the Caribbean.

In 1779, when he was only 12 years old, he accompanied his master to aid the American revolutionaries in the Battle of Savannah.

This long siege is Christophe's first encounter with violent revolution.

Very little has been written about Christophe's life in the immediate aftermath of the war.

For the next ten years, we know he worked as a mason and waiter in hotels in the French colony of Saint-Domingue, then called Haiti.

In 1791, when the colonial slaves revolted, Christophe got another chance to fight for his freedom.

The rebels, led by Toussaint Louverture, fought not only the plantation owners, but also British and Spanish forces seeking control of the island.

Christophe quickly rose through the ranks and proved to be on par with experienced generals.

By 1793, Louverture had succeeded in freeing all slaves on Sandming, and by 1801 had established the island as a semi-autonomous colony.

During this period, however, Napoleon Bonaparte seized power in France and made it his mission to restore slavery and French authority throughout the empire.

Attempts to restore slavery in France met with fierce resistance, and General Christophe even burned the capital to prevent military occupation.

Finally, a mutiny and an outbreak of yellow fever forced the French soldiers to retreat, but the battle was not without casualties.

Louverture was captured and left to die in a French prison. Jean-Christophe's 9-year-old son will share that fate just a few years later.

After the revolution, Christophe and the generals Jean-Jacques Dessalines and Alexandre Petion rose to important positions in the new government.

In 1804, Dessalines was proclaimed emperor of independent Haiti.

However, his desire to hold exclusive power alienated his supporters.

Ultimately, Dessalines' rule provoked political intrigue and ended in his assassination in 1806.

The ensuing power struggle sparked the Civil War and divided the country in two.

By 1807, Christophe was ruling as president in the north of Cap-Haïtien, and Petion in the south from Port-au-Prince.

Petion sought to stay true to the revolution's democratic roots by imitating the United States for the republic.

He even supported anti-colonial revolutionaries in other countries.

These policies endeared him to the public, but slowed trade and economic growth.

Conversely, Christophe had more aggressive plans for Haitian independence.

He redistributed land to the people while maintaining state control over agriculture.

He also established trade with many foreign countries, including Great Britain and America, and promised non-interference in their foreign policies.

He even built a huge citadel in case the French tried to invade again.

To achieve all this, Christophe introduced forced labor and was crowned king in 1811 to consolidate his authority.

During his reign, he lived with his wife and three remaining children in an elegant palace called Sans Souci.

Christophe's kingdom oversaw the rapid development of trade, industry, culture and education.

He brought in famous European artists and European teachers to the Haitian cultural scene to establish public education.

But while the king was initially popular with his subjects, his work orders were offensive reminders of the slavery the Haitians fought to destroy.

Over time, his authoritarian policies fell out of favor and the Southern opposition gained strength.

His reign finally came to a tragic end in October 1820.

A few months after he was so weakened by a stroke that he was unable to govern, key members of the army defected to the Southern Forces.

Betrayed and depressed, the king committed suicide.

Today, traces of Christophe's complex history can still be seen in the ruins of crumbling palaces and Haiti's legacy as the first country to permanently abolish slavery.

I developed my own definition of success in 1934 while teaching high school in South Bend, Indiana. I was a little disappointed and perhaps [disillusioned] that the parents of the students in my English class were expecting A's or B's from their students.

They thought C was fine because all the kids in the neighborhood were average.

But they weren't content to do their own thing. It will make teachers feel that they have failed, or that young people have failed.

that is not correct.

The good Lord in His infinite wisdom did not create us all equal as far as intelligence is concerned, any more than we are equal in size and appearance.

Not everyone can get an A or a B. I didn't like that kind of judging method. I also knew how graduates of various schools judged coaches and athletic teams in the 1930s.

Winning all of them is considered quite successful, but not entirely successful.

Because it turns out we haven't lost a game in years at UCLA.

But in individual matches, it seems we didn't win by as close as some of our alumni expected -- (laughs), and quite often we really felt they backed up their predictions in a more material way.

(Laughs) But I understood that because it was true in the '30s.

But I didn't like it and disagreed.

I wanted to come up with something that could make me a better teacher and give the kids under my supervision something to aim for besides doing better in the classroom, whether it was track and field or in the English classroom, or scoring more points in athletic competitions.

I thought about it for quite some time and wanted to come up with my own definition.

And I knew that Mr. Webster defined it as the accumulation of material possessions, or the attainment of a position of power or prestige, or a worthy achievement of the kind, which, in my opinion, does not necessarily indicate success.

So I wanted to come up with my own.

And I remember—I grew up on a small farm in Southern Indiana, and my father tried to teach me and my brothers never to try to be better than others.

I'm sure he did it at the time, but I didn't -- I didn't -- well, somewhere, perhaps in the hidden depths of my mind, it popped up years later.

Never try to be better than others, always learn from others.

Never stop striving to be the best you can be. it is under your control.

When you get too preoccupied, involved, or worried about things you can't control, you negatively affect the things you can control.

It was then that I came across a simple verse: "At the feet of God the poor soul knelt and bowed his head in confession.

'I failed! ' he cried.

The Master said, 'You did your best, that's the success'. ” From these, and perhaps another, I created my own definition of success. It is "a peace of mind that can only come from the self-satisfaction of having worked to the best of one's ability."

I think it's true.

If you try to the best of your ability and try to improve your situation, I think that's success. I don't think it's something that other people can judge. It's like character and reputation. Your reputation is how you are perceived. Your personality is who you really are.

And I think that personality is much more important than how you are perceived.

It would be nice if both were good, but they are not necessarily the same.

Well, that was my idea that I was trying to pass on to young people.

I've encountered other things as well.

I love teaching and my previous speaker said he loves poetry, so I've dabbled in poetry a little bit and I love it.

There are a few things that have helped me, and I think it turned out better than I thought.

I know I'm not who I should be, but I think I would be better off if I didn't encounter certain events.

One of them was a small poem: "No written word or verbal petition can teach our youth what they should be. Every book on the shelf is what the teachers themselves are."

It left an impression on me in the 1930s.

And I more or less tried to use it in my teaching, whether it was sports or an English classroom.

I love poetry and have always been interested in it in some way.

Perhaps it was because my father used to read to me at night by the light of coal lamps. Our farm had no electricity.

And Dad read poetry to us. That's why I always liked it.

And almost at the same time that I encountered this passage, I also encountered another scripture.

Someone asked a female teacher why she teaches, and after a while she said she wanted to think about it.

Then she came up and said, 'They ask why I teach, and I answer, 'Where can you find such a fine fellow?

Next to him sits a doctor whose quick and steady hand might repair a bone or stop the flow of vital blood.

And there are builders. The arches of the churches he built may be lifted up, where pastors may speak the word of God, leading stumbling souls to touch Christ.

And the teachers, the farmers, the merchants, the workers, the people who work, vote, build, plan and pray for a better tomorrow.

And I may say, "I may not see church, hear the Word, eat food that is grown by their hands, but I may still be able to do it." And later I may say, I knew him once, and he was either weak or strong or bold or proud or gay.

I knew him once and he was a boy then.

They ask me why I teach, and I answer, "Where can I find such a great company?"

And it's a great pleasure to see them carry on.

I have always tried to make young people feel that they are here to be educated. Basketball was second. because you are paying. Social activities need a little time, but if you prioritize social activities a little over the other two, you won't have much longer.

That was the idea I tried to convey to the young people under my supervision.

I have three rules that I have followed almost all the time.

I learned these things before coming to UCLA and decided they were very important.

One is "Never be late".

Then I said something. Players have to be neat if they leave somewhere.

There was a time when I wore a jacket, shirt and tie.

Then I saw the prime minister coming to school in denim and turtlenecks and thought it wasn't right for me to keep this other [rule] so I kept it - they had to be neat.

You've probably heard, I had one of my greatest players, Bill Walton.

He came to catch the bus. We were leaving to play somewhere.

And he wasn't clean or tidy, so I wasn't going to let him go.

He couldn't catch the bus and had to go home and clean up to get to the airport.

So I stuck with it. I believed it.

I believe in time Very important.

I think they should come on time, but what I felt during practice, for example, is that they start on time and finish on time.

Young people didn't have to feel that we were trying to hold them back.

When I speak at coaching clinics, I often say to young coaches: And in coaching clinics, they are more or less young coaches in the profession.

Most of them are young and probably newlyweds.

And I say to them, "Don't be late for practice, because you'll go home in a bad mood. It's not good for a young married man to go home in a bad mood."

When you get older, it doesn't make any difference, but--" (laughter) so I believed: on time.

I believe it will start on time and I believe it will finish on time.

And the other thing I felt was that not a single word was blasphemous.

One swear word and you won't be able to get out of here for the day.

If you see me at a game, you'll come out and sit on the bench.

And third, never criticize your teammates.

I didn't want that. I used to tell them I was getting paid for it.

that's my job. I'm getting paid to do it. Pathetically poor, but I get paid to do it.

Not like today's coaches, mind you, they're not.

My time is a little different.

These three things have always stuck with me.

And they actually came from my father.

That's what he once tried to teach me and my brothers.

I eventually came up with the pyramid, but I don't have time to look into it.

It's like this: My definition of success is that there are blocks in the pyramid, the foundation of which is hard work and dedication, working hard, enjoying what you do and reaching the top.

And at the very top is faith and perseverance.

And I tell you, whatever you are doing, be patient.

Patience is required -- we want things to happen.

they want to change everything. They see all change as progress.

And when we get a little older, we let things go.

And we forget that there is no progress without change.

So I think you have to have patience and we have to have faith.

I think we have to believe, really believe.

Don't just serve with words, trust that if we do what we do, things will work out.

I think our tendency is often to hope things go our way, but we don't do what it takes to make it happen.

I worked on this for about 14 years and I think it made me a better teacher.

But it all revolved around the original definition of success.

As you know, many years ago there was a Major League Baseball umpire named George Moriarty.

He spelled Moriarty with just one "i".

I had never seen it before, but he did.

Major League Baseball players -- they're so sensitive about this, they've noticed that he has only one "i" in his name.

You'd be surprised how many people told him on several occasions that he had one more than he had in mind.

(Laughter.) But he wrote something that I think he did what I tried to do with this pyramid.

He called it "the road ahead, or the road behind."

He said, "Sometimes I think Fate must be grinning when we blame her and claim that the only reason we didn't win was that she missed out.

But the ancient assertion that "you win or lose is within yourself" lives on.

The shiny trophies on our shelves can never win tomorrow's game.

You and I both know that deep down we always have a chance to win the crown.

But when you don't do your best, you just haven't passed the test of going all out and not saving anything until you really win the game. To show what the grid means. Play until the end even if others quit. To persevere without giving up.

Bearing down wins the cup.

Dreaming has a goal ahead of it. Hope when our dreams are over. Pray when hope is gone. Still, if you're brave enough to give it your all, even if you lose, don't be afraid to fall.

Because no one expects more from a man than to give it all in his due time.

It seems to me that giving everything is not far from winning.

Therefore, no matter how twisted fate may be, things rarely go wrong.

You and I decide our destiny—we are the ones who open and close the gates of the road ahead and the road behind. ”

I remember another set of three that my father tried to pass on to us. "Don't whine." Don't complain. Please don't make excuses.

Just go out there and do the best you can in whatever you do.

And no one can do more.

I also tried to tell him that, as my opponent would say, I never heard him mention winning.

Never mention victory.

My thinking is that if you beat someone in a match, you can lose, and if you beat someone, you can win.

I have felt that way on certain occasions and at various times.

And I wanted them to have their heads up after the game.

I used to say, when the game is over and someone doesn't know the result, I wish they could tell from your actions whether you outperformed them or they outperformed you.

That's what really matters. If you put in the effort to do your best on a regular basis, the results will be what they should be.

Not necessarily what you want, but it will be what it should be. Only you know if you can do it.

And that was what I wanted from them more than anything else.

And as time went on and I learned more about other things, I think it worked out a little better in terms of results.

But I wanted match scores to be a byproduct of other things rather than an end in itself.

I think it was Cervantes, one of the great philosophers who said that.

Cervantes said, "The journey is better than the end."

And I like it.

I think it's going -- it's coming there.

But getting there is fun.

As a UCLA basketball coach, I used to think of practices as the journey and the game as the end result.

I liked to go to the stands and sit and watch the players play and see if I did a decent job that week.

Once again, players can take pride in having worked hard to reach their full potential.

People sometimes ask me who was the best player I had or was the best team.

I can never answer that.

As far as individuals go, I was asked about it once and they said, 'Assume you can be a perfect player in some way.

what do you want "

And I said, "Well, I want someone who knows why he's at UCLA. To get an education, he was a good student and really knew why he was there in the first place."

But I also want something I can play.

We want someone who recognizes that defense usually wins championships and who works hard on defense.

But I also want players who can play aggressively.

I want him to be selfless and look for passes first and not shoot all the time.

And I want what I can and will pass.

(Laughter) There were things I could do and things I couldn't do, and things I could do.

And I wanted to be able to shoot from the outside as well.

I wanted the inside to be better.

(Laughs) I want you to rebound firmly at both ends.

Why not hire someone like Keith Wilkes and leave them alone?

he was qualified for it.

Not the only player, but he was the player I used in that category. Because I think he tried to be the best.

In my book, They Call Me Coach, I mentioned two players who gave me great satisfaction. I think that's closer than any player I've ever reached to my full potential. One is Conrad Burke and the other is Doug McIntosh.

When I saw them as freshmen, on our freshman team, freshmen weren't allowed to play on the varsity team when I was teaching.

I thought, ``Oh, with these two guys, it's one or the other''--different years, but when he was there, I was thinking of each player--``Oh, if he ever played for the national team, our national team would be in pretty bad shape, if he's good enough to be on the national team.''

And you know, one of them was a starting player for a season and a half.

The other played 32 minutes in a national championship game the following year and did a great job for us.

The following year he became the starting player for the national championship team. I thought he would never play here, but then – so they give you great joy and great satisfaction to watch.

Neither of those youngsters could shoot very well.

However, because he didn't overdo it, his shot success rate was outstanding.

And although neither of us jumped very well, we kept a good position and rebounded well.

They recalled having assumed that all the shots taken would be missed.

Too often I waited to see if I missed it, and then they left, too late, and someone else was there first.

They weren't very fast, but they kept their balance and played in good positions.

And they defended very well for us.

I mean, they were closer to reaching their full potential than any player I've ever played with.

So I consider them as successful as Louis Alcinder or Bill Walton or many of our other artists. We had some outstanding players.

Did I rambling enough?

I was told to shut up when he showed up.

(laughter) (applause)

When most people think of the beginning of AIDS, they think of the 1980s.

And indeed, this decade was the decade in which AIDS and the virus that caused it, HIV, were discovered.

In reality, however, the virus passed to humans decades ago from its origins, chimpanzees, to humans who hunted these apes.

This photo was taken in Brazzaville, Congo, before the Great Depression.

Thousands of people may have been infected with HIV at this time.

So there are some very important questions.

Why did it take until 1984 to discover this virus if it was in thousands of people at this point?

Now, more importantly, if we were there in the 40's, 50's and 60's, if we had seen this disease and understood exactly what was going on with it, how would the nature of the way this pandemic has progressed changed and changed completely?

In fact, this is not unique to HIV. Most viruses come from animals.

You can think of this as a kind of pyramid where viruses spring up from animals to the human population.

But it is only at the top of this pyramid that these things become fully human.

Nevertheless, we are concentrating most of our energies on this level of the pyramid, already fully adapted to humanity, and trying to deal with things that will become very difficult to deal with, as we have seen in the case of HIV.

So, for the past 15 years, I've been working here to really study an early interface, a term coined by my mentor Don Burke: viral chat.

The idea is that we can study how these viruses affect human populations and how these pathogens move among humans. Capturing this moment may move you into a situation where you can be caught early.

Well this is a picture. I'm going to show you some pictures I took from the scene.

Here is a photo of a Central African hunter.

It's actually a fairly common picture.

The blood is what I want you to pay attention to. It means that a huge amount of blood contact can be seen.

This was just the key for us. This is a very intimate form of connection.

Therefore, when studying viral chatter, it is necessary to investigate these populations that are in intensive contact with wild animals.

So we've been studying people like this person.

We take blood from them and other specimens.

We focus on diseases that occur not only in humans but also in animals.

And ideally, this will enable early detection of these organisms' invasion of human populations.

And the basic purpose of this study is not to go out and observe these individuals once, but to establish thousands of individuals from among these populations and to monitor them regularly and continuously.

We collected specimens from them when they got sick.

We actually asked them to work with us, and we're doing that now, but we're going to be collecting specimens from animals.

We give them this little filter paper.

When they take samples from animals, they collect blood on filter paper. This allows us to identify as-yet-unknown viruses from exactly the right animal, that is, the animal that is actually being hunted.

(Video) Narrator: Two hunters chase their prey deep in a remote part of Cameroon.

Their names are Patrice and Patty.

They are looking for bushmeat. Forest animals you can kill to feed your family.

Patrice and Patty go hunting in the woods around their home most days.

They have a series of traps they set up to catch wild pigs, snakes, monkeys, rodents, really anything.

Patrice and Patty have been out for hours, but find nothing.

The animals are just gone.

We stop for water.

Then you will hear a rustling sound in the brush.

A band of hunters approaches with packs of wild game.

There are at least three viruses you know that exist in this particular monkey.

Nathan Wolfe: This species, yes. And there are many more pathogens in these animals.

These individuals are at certain risks, especially if they have blood contact, they are at risk of infection and may also become infected with new viruses.

Narrator: As the hunters show off their achievements, something amazing happens.

They showed me the filter paper they used to collect the animal's blood.

Blood will be tested for zoonotic viruses as part of a program Dr. Wolfe has set up over the years.

NW: So this is from this animal right here, the giantspotnosegenon.

Everyone with these filters has, at a minimum, our basic health education about the risks associated with these activities. Perhaps from our perspective, it gives them the ability to reduce risk to themselves, and obviously to their families, villages, countries and the world.

NW: Okay, before I continue, I think it's important to say a few words about bushmeat. Bushmeat is wild game hunting.

OK? And all kinds of bushmeat can be considered.

I will tell you about this.

When your children and grandchildren ask you about this time, one of the things they will ask you is, why did our failure to address some of the problems of poverty in these parts of the world drive some of our closest living relatives, some of the most valuable and endangered species on earth, to extinction?

But actually, that's not the only question they ask you about this.

They will also ask why, knowing that this is how HIV enters the human population, and that other diseases can also enter in this way, why let this practice continue?

Why haven't I found another solution to this?

They would say that in severely insecure areas around the world, where there is extreme poverty and population growth, this would lead to food insecurity in the absence of such sustainable resources.

But they will probably ask another question as well.

I think that's a question we all need to ask ourselves. That is why we thought this responsibility lay with this person.

Now, here's that person - you can see it just above his right shoulder - this is the guy who hunted the monkey in the last photo I showed you.

OK, look at his shirt.

Look at his face.

Bushmeat is one of the central crises facing our population, humanity and humanity on this planet right now.

But you can't blame people like this.

OK? And it's not just his responsibility to solve it.

There is no easy solution, but my point is that we ignore this problem at our own peril.

So in 1998, together with my mentors Don Burke and Colonel Mpoudi Ngore, we actually started this work in Central Africa, working with hunters in this part of the world.

My job, I was a postdoc at the time, and I was tasked with setting this up.

So I said to myself: "Okay, good. I'm going to collect all kinds of specimens. I'm going to all different places. It's going to be great."

You know, I looked at the map. I have selected 17 sites. I thought no problem.

(Laughter) Needless to say, I was very wrong.

This is a rewarding job.

Luckily, I have and continue to have some really great colleagues and collaborators on my team. That's the only way to get this job done.

There are many challenges associated with this task.

One is that you earn the trust of the individuals you work with in the field.

On the right is Paul Delong Minutu.

He is one of the best communicators I have ever worked with.

I didn't speak a word of French when I arrived, but I still seemed to understand what he was saying.

Paul worked for Cameroon's national radio and television for many years, speaking on health issues. He was a health correspondent.

So we decided to hire this person. Once he joins the company, he will be able to demonstrate excellent communication skills.

But when I went to these rural villages, I found that no one had a TV and could not recognize his face.

But when he started speaking, they would actually recognize his voice from the radio.

And this man had incredible potential to spread the many facets of our message, whether it was about wildlife conservation or health prevention.

We often encounter obstacles. This is us returning from one of our very rural sites. Specimens from 200 people had to be returned to the lab within 48 hours.

I would like to show you this shot. This is Ubaldo Tamfu, the lead investigator for the Cameroonian site.

Of course you can't see his face, so Ubaldo laughs when I show him this picture.

But the reason I want to show the shot is because you can see he's trying to solve this problem.

(Laughter) That's what he did, he did.

Quickly take some before and after shots.

This used to be our laboratory.

This is how it looks now.

In the early days, dry ice was required to ship specimens. I had to go to the brewery to get dry ice. I begged, borrowed, stole, and had people provide it.

Now we have our own liquid nitrogen.

I would like to call our lab the coldest place in Central Africa - it might be.

And this is my shot, this is my front shot.

(laughs) No comments.

what happened? So the 10 years that we've been doing this work have actually surprised ourselves.

There were many discoveries.

And what we've discovered is that if you look in the right place, you can actually monitor the influx of these viruses into the human population.

It gave us great hope.

What we have discovered is a whole range of new viruses in these people, including new viruses in the same group as HIV: entirely new retroviruses.

And let's be honest, if there's a new retrovirus among humanity, it's something we should be aware of.

That's what we should follow. That should not surprise us.

Needless to say, these viruses that have infiltrated these rural communities are very likely extinct in the past.

Not anymore. Logging roads provide access to urban areas.

And importantly, what happened in Central Africa doesn't stay in Central Africa.

So, after realizing that it was really possible to do this monitoring in practice, we decided to move this out of research and step into a real global monitoring effort.

Through generous support and scientific partnerships with Google.org and the Skoll Foundation, we were able to launch the Global Virus Prediction Initiative and begin work in four different locations in Africa and Asia.

Needless to say, different people in different parts of the world have different types of contacts.

So it's not just Central African hunters.

We also operate in live animal markets, or wet markets, which is exactly where SARS originated in Asia.

But really, from our point of view, this is just the beginning.

Our current objective is to identify new partners in addition to deploying to these sites and getting them all working. Because we feel the need to extend this effort to perhaps 20 or more sites around the world - virus hotspots. Because the real idea here is to cast incredibly wide nets so that these things can be caught, ideally before they reach blood banks, sexual networks and planes. And that is exactly our goal.

Not long ago, there was a time when the discovery of an unknown creature was an incredible awe for us.

It had the potential to really change the way we see ourselves, the way we think about ourselves.

I think there are a lot of people on Earth right now who are in despair and we think we have reached the point where we have found most things out.

I will say it now. Do not despair.

If intelligent extraterrestrials were busy writing an encyclopedia of life on Earth, 27 of these 30 volumes would be devoted to bacteria and viruses, leaving only a few volumes on plants, fungi, and animals, and a footnote on humans. An interesting footnote, but a footnote nonetheless.

Honestly, this is the most exciting time yet for the study of unknown life forms on Earth.

We know very little about the dominant ones that exist here.

And finally, we have the tools to really explore and make sense of that world.

thank you very much.

(applause)

Hundreds of thousands of people are currently on transplant lists waiting for potentially life-saving transplants of vital organs such as kidneys, hearts and livers.

Unfortunately, very few donor organs are available to meet that demand.

What if, instead of waiting, you could create an entirely new customized organ from scratch?

That is the idea behind bioprinting, a branch of regenerative medicine currently in development.

We can't print complex organs yet, but we already know simpler tissues such as blood vessels and tubes that are responsible for the exchange of nutrients and waste products.

Bioprinting is the biological cousin of 3D printing, the technique of building three-dimensional objects one slice at a time by depositing layers of material on top of each other.

Instead of using metals, plastics, or ceramics, 3D printers of organs and tissues use bioinks, printable materials containing living cells.

The majority of many bioinks are water-rich molecules called hydrogels.

These are a mix of millions of living cells and a variety of chemicals that encourage cell communication and growth.

Some bioinks contain a single type of cell, while others combine multiple different types to produce more complex structures.

The meniscus is a piece of cartilage in the knee that keeps the shinbone and femur from rubbing against each other.

It is made up of cells called chondrocytes, and bioinks require a healthy supply of chondrocytes.

These cells can be obtained from donors whose cell lines have been replicated in the laboratory.

Alternatively, individual menisci may be formed that are derived from the patient's own tissue and are less likely to be rejected by the body.

There are several printing techniques, but the most common is extrusion-based bioprinting.

In this case, bioink is loaded into the print chamber and extruded through round nozzles attached to the printhead.

Emerging from nozzles rarely exceeding 400 microns in diameter, it can produce continuous filaments as thick as a human fingernail.

A computerized image or file can be used to position the strands on a flat surface or in a liquid bath to help hold the structure in place until it stabilizes.

These printers are fast, creating a meniscus one thin strand at a time in about 30 minutes.

Some bioinks cure quickly after printing. UV light or additional chemical or physical processes may be required to stabilize the structure.

Once the printing process is successful, the cells within the synthetic tissue will begin to behave similarly to the cells within the real tissue. That is, they signal each other, exchange nutrients, and multiply.

We can already print relatively simple structures like this meniscus.

Implantation of bioprinted bladders has also been successful, and the printed tissue promoted regeneration of the facial nerve in rats.

The researchers created miniaturized versions of lung tissue, skin, and cartilage, as well as semi-functional versions of kidneys, livers, and hearts.

However, recreating the complex biochemical environment of major organs is a challenging task.

In extrusion-based bioprinting, a significant percentage of the cells in the ink can be destroyed if the nozzle is too small or the printing pressure is too high.

One of the most formidable challenges is how to supply oxygen and nutrients to all the cells in a life-size organ.

That's why the biggest successes so far have been flat or hollow structures, which is why researchers are busy developing ways to incorporate blood vessels into bioprinted tissues.

There is great potential in using bioprinting to save lives and advance our understanding of how our organs work in the first place.

And this technology opens up a dizzying array of possibilities, such as printing tissues with embedded electronics.

Could we one day develop organs beyond our current human capabilities, or give ourselves features like non-burning skin?

How much longer can we extend human life by printing and replacing organs?

And exactly who and what will have access to this technology and its amazing artifacts?

What I want to talk about is the idea that cars are art in the background.

This actually means a lot to me. Because automotive designers tend to be a little low on totem poles and don't make coffee table books with just one lamp. And because cars are conceived as products, it's a bit difficult to get into the aesthetic side under the same kind of terms that discuss art.

So cars, as art, bring it into the emotional realm. If you accept it, you have to treat it on the same level as art with a capital "A".

Well, at this point you will see a picture of Michelangelo.

This is completely different from a car.

Cars are self-driving, right? An elevator is a car.

And they are less emotional. they serve a purpose. And yes, cars have been around for 100 years and have made our lives much more functional in many ways. They are also really thorny problems because cars are really problems that we have to solve.

We have to solve pollution, we have to solve congestion. But that's not what I'm interested in in this speech.

Cars are what got me interested in this speech. Your car may be something you use, but in many ways it is who we are.

And I believe that as long as we can solve the automotive problem, and as BMW is really in vogue, with fuel cells and hydrogen and a lot of other things, I think we can get past that and try to understand why we have this hook of automotiveness in so many of us and what it means and what we can learn from it.

That's what I want to aim for. A car is not clothing. A car is an avatar. A car is an extension of yourself. The car receives your thoughts, ideas and emotions and amplifies them. Anger or whatever. It's an avatar.

It's the superwald you happened to be in in the car, and if you feel sexy, the car will be sexy too. And if you're into road rage, you've got "Chevrolet: Like a Rock," right?

Cars are sculptures - did you know this?

Every car out there is hand carved.

A lot of people think, "Well, it's a computer, and it's done by a machine or something like that, isn't it?"

Well, I'm reproducing it, but the original is all hand-made.

It is done by men and women who are confident in their craft.

And they put the same kind of tension into car sculptures as they do with the great sculptures you see in museums.

When there is a tension between the need to express and the need to discover, something new can be put in there and at the same time the limits of craftsmanship are created.

The rule is that this is how surfaces should be treated. This is what controls are all about. This is a way to show that you are a master of your craft.

And the urge to do something new, the sense of discovery, and at the same time a sense of commitment to craftsmanship, is as strong in cars as it is in anything else.

We work with clay, and that hasn't changed much since Michelangelo started playing with clay. This also has some very interesting parallels.

Quick -- Michelangelo once said he was here to "discover the person within."

Now for the car.

It's been exactly 100 years -- get it?

A lot has changed over there and over there.

OK, that's not marketing. There's a very interesting car concept here, but I'm not talking about the marketing part here.

I would like to talk about this.

Why should I wash my car and what is the sensuality that must be touched upon? That's the sculpture that goes into it. its sensuality.

And it's done by men and women who work just like this, building cars.

Now, this little quote about Henry Moore's sculpture, I believe that the 'inner pressure' Moore is talking about, at least when it comes to cars, really comes back to this idea of ​​averages.

It's the will to live, to survive, to express yourself, which comes in a car and takes over people like me.

And until this happens, we keep telling others, "Do this, do this, do this."

We are totally infected. And beauty can be the result of this contagiousness. very impressive.

Of course, this sculpture is at the heart of everything and is what infuses our vehicles with craftsmanship.

And really, it doesn't make much of a difference when they work this way or when someone works this way.

It's the same kind of commitment, the same kind of beauty.

Now let's get to the point. I would like to talk about cars as art.

Art in the Platonic sense is truth. It's beauty and it's love.

This is the crossroads for designers and engineers in the automotive industry.

We have no problem talking about love.

In that sense, we have no problem talking about truth or beauty.

that's what we're looking for. As we work, we really try to find the truth out there.

We are not looking for vanity or beauty.

We try to find beauty in truth.

However, engineers tend to think of things a little more Newtonian rather than this quantum approach.

We are dealing with irrationalism and the paradoxes that we allow to exist. Engineers tend to think of things like 2 and 2 is 4, if you get 4.0 it's better, 4.000 is even better.

And that can sometimes lead to a bit of divergence as to why we do what we do.

But we mostly accept the fact that there are women in the BMW organization. BMW is a very masculine company. men, men, men. it's an engineer.

And we have a feminine side to it. okay, that's cool. Be manly. It becomes a little more feminine.

Because we are interested in finding forms that go beyond mere functions.

We are interested in finding beauty beyond mere aesthetics. It's really true.

And I think the idea of ​​a soul at the heart of a great car is very much applicable. You all know that. One look and you'll know that the car has a soul. You can see how strong this is.

For me, this love experience and design experience are interchangeable. And now I come to my story.

Through my Deep Blue project, I discovered something about love and design.

First of all, just hang with me and say that if you take the word "love" out of many things in society and put the word "design" in it, it still works like this quote. It has some kind of effect, you see?

It is understandable. It works on a truism.

"All is fair in design and war."

We certainly live in a competitive society.

I think this is a pop song that describes Philippe Starck well to me, you know, this is like puppy love, this is cool, right?

Nice toothbrush.

It gets really serious when you see something like this. OK?

(Laughter) This is one of those replacements that I believe all of us in design management are guilty of.

And this idea that there is more to love, more to design, when it comes down to neighbors and others, can and will probably become so physical in this way.

But now it's important to deal with our own people, our own team, doing the production. So to my story.

It's the idea of ​​people work that we're working with here, and when you make a BMW you have to build a bond with the designers.

We need to share intimacy and share vision. So we have to work as one family. We should understand ourselves as such.

There are good times. There are interesting times. There are stressful times.

If you want to do a car, you have to go outside.

I have to drive a car in the rain. I have to drive a car in the snow.

By the way, this is the presentation we gave to the board of directors.

We carry their butts out in the snow too. Want to know about cars outside?

Well, you have to stand outside to do this.

And they are artists, so they have a very artistic temperament.

have understood? Now, one thing about art is that art is discovery, discovering yourself through art. right?

When it comes to cars, we're all a bit like Pygmalion, completely obsessed with our creations.

This is one of my favorite paintings and it really shows the relationship between us and our cars.

This is incredibly sick.

(Laughter) But because of this, intimacy when we work together as a team takes on a new dimension, a new meaning.

We have a shared center. we have a common focus. Cars are at the center of all our relationships.

And it's my job to narrow this down in the competitive process.

Today I heard about Joseph's death gene. The gene must disrupt cell regeneration.

You know, that's what I have to do sometimes.

Start with 10 cars. Narrow it down to 5 cars, narrow it down to 3 cars, narrow it down to 2 cars, narrow it down to 1 car. Basically, I'm in the middle of that carnage.

Someone's love, someone's baby.

This is very difficult and requires a bond with a team that allows this. Because the life of the team also depends on it.

Their bodies are also infected with that gene, and above all, they want that gene to live on.

Well, this project, Deep Blue, allowed me to reach out to the team in ways I never expected. And I would like to tell you that. Because I want you to reflect on this, perhaps in your own relationships.

We wanted to create a car that was completely drastic for BMW.

We wanted to create a team that was far from the way things were done, so I only had a phone number to connect with them.

So what we've done is, instead of having a staff of artists at the wrist, we've freed up a team of creative designers and engineers to find a successor to the SUV phenomenon in America.

I did this project in 1996. So, I sent out with this team name "Deep Blue". Many people now know IBM's Deep Blue. We actually stole it from IBM. I figured if someone read our fax, they'd think I was talking about computers.

Deep Blue from a company like BMW has a hook called "Deep Blue", so it turned out to be a very clever name. Wow, cool name.

So people get caught up in it. And we took a team of designers and sent them to America. And we just gave them a budget, a set of deliverables, and a schedule. I gave nothing else.

Like I said, I just had a phone number to reach them.

And the idea was that a group of engineers would work in Germany and separately tackle this question of what the successor to the SUV would be.

They got together and compared their notes. And together they have produced a monumental set of diverse opinions that work apart, unite, never taint each other's ideas, but at the same time unite to solve problems.

If possible, I would like to truly understand the essence of our customers, understand where they are, and live with them in America. So we sent the team off, but something else actually happened. they went elsewhere.

(Laughter) To be honest, they were gone and all I got was a postcard.

Well, I got some postcards of them in Las Vegas, I got some postcards of them in the Grand Canyon, I got some postcards of them in Niagara Falls, and soon they'll be in New York, and I don't know where else.

And I say to myself, "This is going to be a great car. They are doing research that I never thought possible."

right? And instead of owning a studio and six or seven apartments, they decided it would be cheaper to rent Elizabeth Taylor's original home in Malibu.

And—at least they told me it was her house. I think they used to have parties there or something.

But anyway, this was the house and they all lived there.

Now we live here 24/7, 6 people left the house, some left their wives and families, they literally lived in this house for the entire 6 months the project was in America, but the first 3 months were the most intense.

One of the young women who participated in the project, she is an amazing woman and actually built her own room in the bathroom.

The bathroom was so big that she made a bed over the bathtub. It was so charming.

On the other hand, I knew nothing about this. OK?

none. With all this going on, all I get are postcards from people in Las Vegas or something saying, "Don't worry, Chris, this is going to work really well." OK?

I mean, my concept of what a design studio is, I probably didn't understand where they are.

But back in Munich, engineers were trying to use this sort of Newtonian solution to see how many cupholders could be made to dance on the pin's head. And, you know, I was trying to find out these really serious problems facing the modern consumer.

And one would expect these two teams to come together, in an incredible environment, with incredibly stressed engineers combining their incredible creativity to come up with an incredible solution.

Well, what I didn't know, and what we found out, was that they don't even like talking to each other in those situations.

At that point there was a disconnect between Newtonian and Quantum thinking, a rift in the dialogue, so deep that the two so far cannot bring it all together.

So, three months later, we had our first meeting in Tiburon, just down the road from here. Do you know Tiburon?

And the idea was, after the first three months of this independent study, to submit it all to Dr. Goschel (now my boss and co-leader of the project at the time) and publish the results.

We know where we're headed, and we'll see the first signs of what could be the next SUV phenomenon in America.

So I had an idea in my head that this would be great.

I mean, I'm going to see a lot more work, and it's going to be very intense. I know Las Vegas probably meant a lot, and I'm not quite sure where the Grand Canyon came from. But somehow all of this comes together and you're going to see some really great work.

So we went to Tiburon three months later, and the team had been together days in advance the week before.

The engineers flew in, and the designers also gathered together to wrap up the presentation.

Well, it turns out that the engineers did nothing.

And they did nothing. Because, just like in the automotive business, engineers exist to solve problems and we asked them to create problems.

And the engineers waited for the designer to say, "This is a problem we created. Come help us solve it."

And they couldn't talk about it. So what happened was the engineers showed up with nothing.

And the engineers said to the designers, "If you come in with all your stuff, we're out. We're out of the project right now."

I didn't know anything, but I received a presentation with the following agenda:

We had a lot of dialogue.

We spent four hours discussing all the vocabularies we needed to build between our engineers and designers.

And here I'm always expecting, 'OK, they're going to turn the page, and I'm going to see the car, I'm going to see the sketch, and maybe I'm going to see an idea of ​​where it's going.'

The dialogue continued, constructing a verbal map in my head, and it soon became clear that I was not being dazzled by the brilliance, but rather by the nonsense and seriously bewildered.

And if you can imagine what this would be like, postcards over the next few months showing how great a job this team is doing, and how much money they've spent, how much they've learned, and how much they've done.

You went crazy ballistic, right? I was mad.

You may remember Tiburon, but it used to be like this.

After four hours, I got up and dismantled this team.

I shouted at them, "What the hell are you doing?"

You guys are letting me down, you guys are supposed to be my designers and creatives, what the hell is going on here? ”

Perhaps this was one of my better rants. I have some good ones, but this was probably one of my better rants. And I went in among these people. How did you manage to steal BMW's money, how did you go on vacation for three months, produce nothing, produce nothing?

Because of course they didn't tell us that they had three station wagons full of drawings, model concepts and photos. Everything I wanted was locked in the car because they were showing solidarity with the engineers. And he decided not to show me anything to give me a chance to start solving the problem. Because they, of course, did not realize that they could not create problems.

So we went to lunch -- (laughter) and I must say this was a really quiet lunch.

All the engineers sat at one end of the table, the designer and I sat at the other end of the table and it was really quiet.

And I was just furious, furious. OK?

Probably because they had a lot of fun and I didn't.

That's what makes you furious, right?

And someone asked me about my wife Catherine. Did she go out with me on a plane or something?

I said 'no' and it got me thinking about my wife.

And then I remembered that when Katherine and I got married, the priest gave a very nice sermon and said something very important.

"Love is not selfish. Love is not counting how many times you say 'I love you'," he said. If you haven't had sex this much this month and two less than last month, you don't love me that much.

Love is not selfish.' And I thought about this, and I thought, 'I'm not showing love here.

I'm in the air, I'm in the air without trust.

It can't be. It doesn't expect a specific number of sketches. For me, that's the quantifiable way to evaluate a team.

No way. ”

So I told them this story. I said, "Guys, I'm thinking something here, but this is not right. I can't relate to you on any quantifiable assumptions.

Based on the imperative premise of "I am the boss, you do what I say without trust," I said, "It can't be."

In fact, to be honest, we all broke down in tears. Because they still didn't tell me how much frustration they had built up inside of them because they couldn't show me what I wanted and had to trust me it would come.

And I think we felt closer that day. We cut a lot of strings that didn't need to be there and built a concept of what a real team and creativity could be.

I think we brought cars back to the center of our thoughts and love really back to the center of the process.

By the way, the team created six different concepts for the next model as a proposal for the next generation of SUVs in the United States.

One of them was the idea of ​​a crossover coupe. It's downstairs, it's an X Coupe. They enjoyed this very much.

It was a recreation of what Carl Magnusson called the 'barbaric' motorcycle, the GS, with the idea that adding two more wheels could turn it into a motorcycle.

In conclusion, the lesson I wanted to pass on to you is this. I will also quote a little from "The Little Prince".

Knowing that trust and love are synonymous with design, there's a lot to be said for that.

I developed a very meaningful relationship with the team that day, and it has been ever since.

And I hope that you, too, realize that design and the art of design are worth more than designing yourself.

Certainly, trust and affection are valuable.

thanks so much.

(applause)

About 15 years ago, I visited a friend in Hong Kong.

And at that time I was a very superstitious person.

So when I landed - this is still Hong Kong's old airport, Kai Tak Airport, in the middle of the city - I thought, 'If I see anything good, I'll have a good time here for two weeks.

So the plane landed between the buildings and came to a complete stop in front of this little sign.

(Laughs) And actually during my stay in Hong Kong, I visited some Hong Kong design companies.

And as it turns out, I was just there to see what they were doing in Hong Kong.

However, I actually got a great job offer and left.

Then I returned to Austria, packed my things, and a week later, on my way to Hong Kong again, I was still superstitious and thinking:

(Laughs) But if it were to go away, it would be really miserable and stressful. ”

So it turns out that not only was the sign still standing, but they had put this up right next to it.

(laughs) On the other hand, I had a really bad time in Hong Kong, so it also taught me where superstitions lead me.

(Laughter) But there were a lot of really happy moments in my life. I mean, I think it's what the conference brochure calls a "breathtaking moment."

I'm good at making lists, so I actually listed them all.

(Laughter) Well, you don't have to read it, and I won't read it for you.

I know it's incredibly boring to hear about other people's happiness.

(Laughs) But what I did is I really looked at them from a design standpoint and removed everything that wasn't design related.

And, quite surprisingly, more than half of them were actually design-related.

So, of course, there are two different possibilities.

I was happy to experience design from the consumer's point of view.

Let me give you an example. I got a Walkman for the first time.

This was in 1983.

My brother has a great Yamaha bike and was happy to lend it to me.

And the Police "Synchronicity" cassette had just been released and my hometown of Bregenz had no helmet laws.

That means you're free to drive into the mountains and blow up the police with your new Sony Walkman.

(laughs) And I remember it being a really happy moment.

Of course, these are related to the combination of at least two being design objects.

And, you know, when we talk about design, there's a measure of happiness, but motorcycle affairs would definitely sit somewhere here, somewhere between glee and bliss.

Now, another part from a designer's perspective is whether they're actually happy doing it.

One way to tell how happy a designer is while designing is by looking at the author's photo on the back of the book, isn't it?

(Laughs) So, according to this, not only Mexicans but also Australians and Japanese are very happy.

(Laughter.) On the other hand, the Spaniards are somewhat...

Especially the Swiss (laughs), it doesn't seem to be going very well.

(laughs) Last November, a museum called the Mori Art Museum opened in a skyscraper on the 56th floor of Tokyo.

And their first exhibition was called "Happiness".

And I went to see it with great enthusiasm. Because I was paying attention to this conference.

And interestingly, they divided the exhibit into four different areas.

In "Arcadia", I introduced something like this from the Edo period. 100 ways to express "happiness" in different ways.

Or there was Yoko Ono's This Ringo - which later became the Beatles label, of course.

Under "Nirvana" they exhibited this painting of Constable.

And there was a bit of an interesting theory about abstraction.

This is the blue field. It's actually a painting by Yves Klein.

And the theory is that if you abstract the image, you can open up as much room as possible for what you can't express, and thus engage the viewer more deeply.

Next, under “Desire,” we exhibited Shunsho’s ink paintings on silk, also from the Edo period.

And finally, "Harmony" showcased Tibetan 13th-century mandalas.

Now, what I learned from the exhibition is that, with the possible exception of the mandala, most of the works on display were not really about happiness, but about the visualization of happiness.

And since visualization is such an easy thing to do, I felt a little cheated.

And, you know, in my studio, we've always done that.

This, you know, is a book.

Happy Dog - Take it out, it's an aggressive dog.

Happy David Byrne and Angry David Byrne.

Or a jazz poster with a happy face and a more aggressive one.

You know, it's no big deal to achieve that.

You see, the word 'happy' has gotten such a bad reputation within the advertising and film industry that if you really want to do anything with the subject, and still want it to look authentic, you have to do it from an almost cynical point of view.

As you know, this is a movie poster.

Alternatively, a few weeks ago we designed the Talking Heads box set, and there's definitely a darker side to the euphoria depicted on the cover.

Much more difficult is when the design can actually evoke happiness. Here are three designs that actually made this happen for me.

This is a campaign carried out by a young New York artist who goes by the name of 'True'.

If you've ridden the New York subway, do these signs look familiar?

Tru printed its own version of these signs.

Every Wednesday I got together with 20 friends at a subway station.

They split up different metro lines and added their own versions.

(Laughter) This is one of them.

(Laughter) Now, how this works in the system, no one looks at these signs.

So you're [laughs] really bored on the subway, like you're staring at something.

And it will be a while before it is actually said. You realize that this is saying something different than what it usually says.

(Laughter) So, at least it made me happy.

(Laughter) Now, True is a true humanitarian.

He didn't want his friends arrested, so he gave everyone this fake volunteer card.

(Laughter.) And I also distributed this fake letter from the MTA to everyone. It pretends to be an art project funded by the Urban Transportation Authority.

(laughs) Another New York project.

This is in PS. 1 -- Essentially square room sculpture with retractable ceiling by James Turrell.

Open daily at dusk and dawn.

I can't see the horizon.

You are just there observing the amazing subtle color changes in the sky.

And the rooms are really something to see.

When you enter there, people's attitudes change.

And indeed, after spending an hour there, I have never looked at the sky in the same way.

Of course, there are many more projects than the three presented here.

I can assure you that I was certainly happy when I saw Vik Muniz's "Cloud" in Manhattan a few years ago.

But my last project is still with a young designer from New York.

He is originally from South Korea.

He then decided to print 55,000 large and small speech bubbles. It's an empty speech bubble sticker.

And then he walks all over New York and pastes up empty posters.

(Laughter.) And then other people go and fill it in.

(Laughter) This person is saying, "Let me die in peace."

(Laughter) I think that was the biggest surprise to myself, and that the writing was actually pretty good.

This was written on the musician's poster, which read: "I'm afraid the CD won't sell more than 200,000 copies. As a result, the label will take away any recoverable upfront payment, after which the contract will be terminated and I'll be back playing Journey covers on Bleecker Street."

(Laughter) I think the reason this works is because it benefits everyone involved.

Gee ends up running her own project. The masses get a sweeter environment. And various masses get a place to express themselves. And the advertiser finally gets someone to see their ad.

(Laughter) Well, there was, of course, a question that had been on my mind for a while. Is it possible to do more of what you want to do in the field of design and less of what you don't?

So I went back to making lists. That is, to see what I really like about my job.

One is to just work without feeling pressured.

That way, you can concentrate and work without getting tired.

Or like Nancy said before, really immersive.

Don't get stuck doing the same thing. Also, don't be stuck behind a computer all day.

This has to do with getting out of the studio.

Then, of course, I try to work on what content actually matters to me.

And you can enjoy the final result.

Then, in one of my journals, I found another list that actually contained everything I thought I had learned my whole life.

And about that time, an Austrian magazine called me and asked if I wanted to do a six-page spread. Would you like to design six spreads that act as divisions between the different chapters of your magazine?

And it all came together.

So I chose one of the things I thought I learned. In this case, it means "your actions will always come back to you". And from there I made these spreads.

In other words, “what you do will come back to you”.

A few weeks ago (laughs) I was commissioned to design five billboards for a French company.

Again, we were able to deliver that content.

So I just picked another one.

And this was two weeks ago.

We flew to Arizona and took this photo with me and the designer I work with.

In other words, "trying to look good limits your life."

And then I ran one more of these.

This is also the pagination of magazines.

This is: "Have" -- this is the same thing. It was taken from the side.

This is from the front.

Then there is the “guts”.

Again, it's the same thing. "Guts" is the same room remade.

Then there's "it always works".

And "for" with the light on.

(laughs) And it's "I".

Thank you very much.

(applause)

I thought I would read some of the poems I had on hand on the theme of youth and age.

I was a little surprised to find out how many I actually have.

The first piece is dedicated to Spencer and his grandmother who was inspired by his work.

My poem is called "Dirt".

My grandmother washes my mouth with soap. Half a century later, she still attacks me with that fat, cruel yellow stick.

It's all because of the words I said, didn't actually say, just repeated.

But "Open, open!" she says.

Her hand scratched my head.

I know now that her life was hard. She lost three children when she was young, then her husband also died, leaving her young sons and no money.

She had me standing on the sink to pee because there was no space in the bathroom.

But oh, her soap!

Did not that bitter burning make me a poet?

The street she lived in was unpaved, with her apartment, two cramped rooms, and a stinking kitchen she snuck in and caught me.

Do I admit I could never really love her again after she did that?

Yet she lived to be 100 years old. There was so much sadness and disgust, but to this day I never loved her again.

When it was published in a magazine, I received an angry letter from my uncle.

"You slandered a great woman."

It required a certain amount of diplomacy.

This is called a "dress".

It's a longer poem.

In those days, which now remain to me only as the most elusive memory, the first sound I heard in the morning would have been the chirping of birds, the second the soft hooves of horses driving the milk carriages into the city block, and the last sound of the night would have been the father stopping the car, working late again, always working late, shaking the ashes off the cellar and the hearth, and laboring down to dampen the draft. Falling into bed upstairs - back in the day, women, my mother, my friend's mother, my neighbors, all the women I know wore what is called house dress for most of the day. Wearing a cheap, printed, pulpy, and seemingly purposely shapeless sheer cotton shift dress over a negligee, the twisted hem of the negligee was always uncomfortable when I had to go find my kids, hang the laundry in the net, or run to the corner grocery store, under my coat. nk and yellowed, hanging down.

More than curlers, some women always seemed to have their hair wrapped up in preparation for some great event that never happened--a ball, I think. Instead, most women's faces not only had no make-up during the day, but were shaved, bleached, and plucked, looking like hideous masks. Above all, it was the dress that made women unknowable and forbidden, masters of the mystery inaccessible to men, and impossible for boys to conceive.

Only later did I come to think that the dress was also a declaration. That what you revealed about yourself in the dim kitchen, the laundry, the stark concrete yard was an illusion. Your true sensual nature wrapped in sexless outfits was completely in your control.

In those days, a person hid many other things. Adult men didn't hug each other unless someone died, but that wasn't always the case. They shook hands, slapped friends on the back at ball games, and punched each other as a gesture of affection. When he graduates from childhood, he will never know the shock of his father's cheek beard again. Until finally morality evolved and you could hug another man, hold him for a moment, and even kiss him (now the father's bristles are white and stiff).

The last release is a hug. We were wary, and it seemed so daring, but how much misunderstanding and pain there had been between you, how much unspoken joy there was in that affirmation of equality and fellowship.

I think we knew very little about healing that wound then and now. Even the women in their best dresses, with their hair flowing, even with lipstick and mascara, could only squeeze their hands and begged for peace. Father and son, on the other hand, like thugs, like thieves, like Romans, were boiled and hissed, and inflicted the grief they endured through kisses, just the worst. And we embrace from generation to generation, bleeding from brother to brother.

At that time there was still countryside near the city, with farms, cornfields and cattle. Even not far from our building, with its blurry bricks and long corridors of shadow, we could find lots of hills and trees that made us think of mountains and forests.

Alternatively, you can go out alone into a half-block clearing or bush. Crouching, crawling, simplistic, savage, and alone like leafy creatures. I already had this feeling of wanting to be simpler and never wanting to go back once the call came.

(Applause) This is another long story about the old and the young.

It happened the moment we actually met.

Part of the poem takes place in our shared space and shared time.

It is called "neighbor".

Her five horribly deformed little dogs bark constantly on the roof below my window.

God knows how many of her cats are, but they must be pissing on her rug. Her landing is a nauseating stench.

Her shadow groped once for the chain of the door, then it slammed shut with fear, and only cries and music—jazz—filled the hall day and night.

When Chris Connor sang "Rush Life," it reminded me of my college sweetheart, my true first love, and I played the same record until I broke up with her.

Then she rested her head on my shoulder, her hands on my thighs, and sang sweetly the regrets and weaknesses of her being too young. Later I was too young to believe her pain.

It surprised and bored and repulsed me.

I began to wonder if she had ended up in this fire trap in the village, if my neighbor was her.

I thought we would meet, get to know each other, become friends, and do penance.

I met her at the mailbox, but it wasn't her.

With grayish-yellow hair and army trousers under a nightgown, she turned away, hid her desolate face with her hands, and muttered an inappropriate "Hello."

Sometimes scary things happen in stairwells.

A man who shouts "Shut up!" Dogs growled desperately, clawed their nails, and her voice was hoarse, harsh, hollow, almost just incoherent, incoherent sounds, screeches, bones on metal, metal melting and melting, beckoning them back, "Go home, darlings, go home.

My sweet angels, please come back. ”

The next time I saw her, she was a medium.

The magician, in a trance and ecstasy, hung her ragged coat on the pavement and gaped open, the passers-by flowing around her, her mouth suddenly torn open like a scream, but quietly, but only in the brain or in the chest, as if it had exploded.

A cry so pure, so disciplined, so aloof, it needed no voice, and could no longer bear it.

It is these invisible connections, these transformations and even anguish that seduce us.

The girl, my old lover, the last time I saw her was when she came looking for me at a party. She was drunk, stumbled, felled, sprawled, her skirts rolled up, her eyes were red with blood, swollen with tears, and she felt shame and disgrace.

My ignorant and arrogant crudeness, my secret pride, turn my back.

Rooftop still life, dead tree in barrel, broken bench, dog, excrement, sky.

What path through pain, what crossroads of vulnerability, what crossroads and counterattacks?

There are already too many lives in our lives, too many opportunities for grief, too many unexplained pasts.

"Behold me," the God of fervent inexhaustible love rises in a bloody glow and says, "Behold me."

She struggled down the scattered steps of the entrance hall one step at a time.

I'm holding the door

She walked over the cracked tiles, staggered over the steps to the street, stared blank without looking at me, and said, "Can you help me?"

He took my arm and leaned lightly on it.

A step into her swaying world.

She whispered, "Thank you, love." Lightly, lightly against me.

(Applause.) I'll try to lighten things up a bit.

(Laughter) This is another kind of poetry about youth and age.

It's called "gas".

(Laughter) Wouldn't it be nice to see that blue-haired woman in the doctor's waiting room bend over the magazine table, fart a little bit and blush hard?

Wouldn't it be nice if she could see the intestinal gases materializing in visible clouds and her really harmless pops barely grazing my face and drifting away?

(Laughter) And it's a wonderful coincidence that this is happening now. Because about an hour ago, while we were out for a walk, my dog ​​was startled by a backfire and jumped straight up like a horse.

And it reminded me of the stables I worked at on weekends when I was 12, and the fine spotted stallions that would recoil in the same way every time they were mounted.

And the woman, now shyly burying her face in "El", reminded me that I had forgotten that at least part of my awe consisted of the fact that the horse farts vigorously every time he jumps.

Fluffy! Fluffy! Fluffy!

Something that was never mentioned in the dozens of books I devoured at the time about horses and their riders.

The savage grandeur of it all, the hooves shining like steel, the eruptions expelling from that creature's mighty entrails, the breath holding, the heart stopping, the nostrils splaying madly, I didn't know if I wanted to break him or be him.

(Laughter) (Applause) This is called thirst.

Many poems are actually urban poems. I happen to read a lot of things that aren't.

"thirst."

This is the relationship with the woman who lived day and night on a bench at the 103rd Street subway station last fall and winter, and then disappeared one day.

We looked at each other and examined each other.

I'm shy and try to be oblique and discreet.

She was bold, unblinking, aggressive, even furious, even when the bottle was empty.

i was scared of her I felt like a child.

I feared that a repressed part of myself would spiral out of control, forever trapped in her shocking stench.

Not just excrement, not just unwashed surfaces and openings, but the re-diffusion of rum, there was will, intention, power, purpose -- social and moral anger and rebellion -- despair, sorrow, and loss.

Sometimes I thought I should take her home, bathe her, comfort her and dress her.

She wouldn't have wanted that from me, I think.

Instead, board the train.

How rich is our vocabulary of self-absolutions!

How enduring is our bland, fatal conviction that contemplation is the realization of justice.

The dance of our gazes, the clashes, the pull of each other through the holes of our perceptions, and the existence of the Holocaust, the Holocaust, the many diseases, the wounded, were sacrificed and consumed.

Her all-nighters in places I know continue.

Her occupancy, absolute and loyal attendance.

The dance of our gaze, the challenge, the abdication, the vanishing, the scent of our wonder.

(Applause) This is a newer poem, a brand new poem.

The title is "Something like this happened".

In the fourth-floor corridor of a lycée, a young female student sat on an open window ledge, chatting with a friend between classes. A teacher walks by and reproaches her almost teasingly, "You might fall," and a young eighteen-year-old woman, really a girl, but she doesn't think she's the best in the class, and she's often said to be "beautiful," smiles back, leaning into an open window, which if it were winter someone would have closed it ("Close it!")--leaned into the window, smiling. .

she herself falls.

Casual impulses, fantasies, things I never thought of before, and still can hardly think of...

No, more than impulses and fantasies, a girl knows what she's doing, a girl means something, a girl means, because that's what comes to her in that moment, beautiful or not, bright yes or no, she's not who she is, she's not herself, and the reason is that where she is there are so many plans, so many plots and schemes, and where she is, there are so few people, or if they exist, it's not her. , means nobody. Heal her, it is the self she lives in and lives by her, she thinks so but seems to know what is lacking: grace, not plan, grace, naturally, some kind of being in the world with grace.

The world was weighing heavily on me.

Decorate the world with your weight, but never fully be yourself.

This ego that weighed on me, liberation from it is what I want and what I achieve.

And the girl, in this infinite moment, remembers the grief she once felt, which had already been divided many times, but lived only within herself, little knowing that she felt it.

Yes, the girl falls, falling is absurd, even the earth, driven by the urge to own everything that falls, should know that falling is absurd, but still the girl who falls is not me, nor is she, but the self that I voluntarily made for myself.

eternally. Bless you.

This happened.

(Applause) I'll read one more thing. I don't usually say that.

I just like to finish.

But I'm afraid Ricky will come out here and throw his fists at me.

This is aptly called "Old Man".

An advertisement for a softcore magazine on a neighborhood newsstand reads, "Featured: Big Tits."

But forget about your breasts.

A rich, fresh-lipped blond, golden glowing skin spreads and shines there.

Almost 60 years old, no better than these almost invisible, prostitutes, but still able to turn me on.

Perhaps growing up in the sensual darkness of America and never seeing pristine nipples or uncensored vaginas left me forever infected with an irrepressible eye lust.

A constant erotic tweeter is hardly me unless I am in an early state of desire.

But God knows, your obsession can make things worse.

In Israel last year, a young ultra-Orthodox rabbi who led temples on the Shore forbade teenage girls to look inside one room.

It contained lewd images, he said.

It was a photograph that was on display. Naked men and women, some trying to hide their genitals, others too scared to care, lined up in the snow waiting to be shot and thrown into a ditch.

In horror, the girls averted their gaze.

What carnal mistrust their teachers taught them.

nevertheless. Another confession: once in a book about pre-war Poland, a studio portrait, an absolute angel, an absolute angel with anguished, tormented eyes.

I used to visit her page all the time.

Her death in the camp made her—I couldn't help but wonder why—more present and more precious.

He died in a concentration camp, at a time when people, or Jews, were kept away from children.

But it was like sex and didn't need to be said.

Sex and death, how close are they?

Now sometimes I wonder if I'm confusing them because I'm constantly aware that death is on my way.

My wife's loveliness almost swallows me.

My passion for her is beyond the bounds of common sense.

When we make love she hugs me everywhere around me, i am there but i am not there.

My mind is a mess, a jumble of faces, voices and impressions, and I start life all over again as if I were drowning.

Then I am drowning in despair that I have to part with her, this, all, all, unbearable, terrible.

Yet to be able to die without special repentance, without being slaughtered or enslaved.

And you may rest assured that you won't have to know the next madness or regression in history.

No, no again.

I don't mean it that way.

What I'm trying to say is that the world has taken me so tightly, for better or for worse, in my own stupidity and weakness, that even this fake Venus, with her fake heat and possibly gel-filled breasts, moves me to suffocate.

Vamp. siren. Seductress.

That she reveals more in her ink glow than she knows.

How she embodies our human need for keen attention, our passion to live in beauty, to be beautiful, to be cherished, if not more, by the gaze of love and something like love.

thank you.

(applause)

Newspapers are dying out for several reasons.

Readers don't want to pay for yesterday's news, and advertisers do too.

iPhones and laptops are far more useful than The New York Times on Sunday.

And in the end you have to save the tree.

So enough to kill any industry.

Shouldn't we rather ask, "Can something be done to save newspapers?"

There are several scenarios for future newspapers.

Some say it should be free. Must be tabloid paper or smaller A4. It should be local, community-run, or niche for small groups such as businesses, but it's not free. Very expensive.

It should be opinion based. Less news, more views.

And we would rather read it during breakfast. Because after that I listen to the radio in the car, check my email at work, and watch TV in the evening.

It sounds good, but it only buys you time.

Because, in the long run, I don't think there is any reason, no practical reason, for newspapers to survive.

So what can we do?

(laughter) Let me tell you my story.

Twenty years ago, the Swedish publisher Bonnier began publishing newspapers in the former Soviet bloc.

A few years later they launched several newspapers in Central and Eastern Europe.

They were run by inexperienced staff, had no visual culture and no budget for visuals. Many places didn't even have art directors.

I decided to work for them as an art director.

I used to be an architect, and my grandmother once asked me, "What do you do for a living?"

I said, "I'm designing a newspaper."

"What? There's nothing to design there, just boring letters." (Laughter) And she was right. Until one day, I was very annoyed.

I came to London and saw a performance of Cirque du Soleil.

And I had a revelation. I thought, 'These guys have turned eerie, desolate entertainment into top-notch performance art.'

I thought, "Oh my God, maybe this boring newspaper can do the same thing."

And I did. We started redesigning them one by one.

The cover became our signature.

It was my personal intimate channel to talk to readers.

I'm not going to talk about teamwork or cooperation.

My approach was very selfish.

I wanted my own artistic expression, an interpretation of reality.

I wanted to make a poster, not a newspaper.

Posters as well as magazines.

We were experimenting with type, illustrations and photographs. And we had fun.

I started seeing results right away.

In Poland, our page was named "Cover of the Year" three times in a row.

Other examples that can be seen here are from Latvia, Lithuania, Estonia and Central European countries.

But it's not just the cover.

The secret was that we were treating the whole newspaper like one piece, one piece, like music.

And music has rhythm and has ups and downs.

And design is responsible for this experience.

Turning the page is the reader's experience, and I am responsible for this experience.

The reason why I treat two-page spreads as one page is because readers perceive it as such.

Here you can see some of the Russian pages that have won many awards in Spain's biggest infographic contest.

But the real prize was given by the Society of Newspaper Design.

Just one year after redesigning the newspaper in Poland, they dubbed it "the best designed newspaper in the world."

And two years later, the same award was presented to Estonia.

Isn't it amazing?

What is really surprising is that the circulation of these newspapers has also increased.

Here are some examples. In Russia, plus 11 after 1 year and plus 29 after 3 years of redesign.

Same in Poland: plus 13, with an increase in circulation of up to 35% after three years.

Looking at the graph, we can see that after years of stagnation, the paper started to grow right after the redesign.

But the real hit was Bulgaria.

That's really great.

Did the design do this?

Design is only part of the process.

And the process we did was not to change the look, but to completely improve the product.

I took the architectural rules of function and form and translated them into newspaper content and design.

And I put strategy first.

First of all, I have a big question. Why do you do it? What is your goal?

After that, we will adjust the content accordingly.

And we usually start designing two months later.

My boss was very surprised at first.

Why am I asking all the business questions instead of just showing the page?

But I soon realized that this was the new role of the designer. Be involved in this process from start to finish.

So what is the lesson behind it?

The first lesson is that products aren't the only things that design can change.

It can change your workflow. In fact, it could change everything for your company. It can turn your company upside down.

It can even change you.

And who is to blame? designer.

Empower your designers.

(Applause.) But the second is even more important.

Like me, you can live in a small poor country.

You can also work in a boring branch of a small company.

You can get your job done to the highest possible level without the budget or manpower.

And everyone can do it.

All you need is inspiration, vision and determination.

And we must remember that being a good person is not enough.

thank you.

We started with paragliding.

Paragliders have the potential to fly long distances cross-country simply by paragliding off mountains and using thermals to soar.

Various aerobatics are also possible with paragliding.

From there I started skydiving.

In this photo you can see a 4 way skydive with 4 people flying together. On the left is a camera flyer with a helmet-mounted camera that allows you to film the film itself and the entire jump for judging purposes.

From normal relative skydiving, I progressed to free flying.

Free flying is more like 3D skydiving.

We see a skydiver in a red suit standing.

Dressed in a yellow-green suit, he flies with his head down.

And that's me in the background carving around the entire formation in freefall, using a helmet camera to film this jump.

I went from free flying to sky surfing.

Skysurfing is skydiving with a board on your feet.

You can imagine that there is a lot of force, a lot of power, on this big surface of a skysurf board.

Of course, you can also use this force for nice rotations, for example. We call this "helicopter movement".

From there we proceeded to wingsuit flying.

Wingsuit Flying is a suit that allows me to fly with just my body.

Tension on the body, tension on the suit, and you can fly. As you can see, it falls much slower due to the wider surface.

With proper body position, you can go a long way and gain a lot of distance.

This is the jump I did in Rio de Janeiro.

You will see Copacabana on your left.

From there, I picked up all my skills and knowledge in different areas of paragliding and skydiving and proceeded to BASE jumping.

BASE jumping is skydiving from a fixed object, such as a building, antenna, bridge, or ground, i.e. a mountain or cliff.

For me, it's certainly the ultimate feeling of being free-falling, including all visual references.

So my goal was soon to discover new places that no one had dived before.

So, in the summer of 2000, I BASE jumped for the first time on the Eiger North Face in Switzerland.

Two years later, I had my first successful BASE jump from the Matterhorn, a very famous mountain that everyone probably knows here.

In 2005 I BASE jumped from three very famous mountains in Switzerland: Eiger, Monk and Jungfrau.

What was special about these three jumps was that we hiked them all and climbed them all in just one day.

In 2008 I dove into the Eiffel Tower in Paris.

(Laughs) So, with all this knowledge, I wanted to be involved in stunts as well.

So, along with some friends, I started doing different tricks. For example, like this jump, I jumped off a paraglider.

Or here in Austria, where I did this shoot, it was so cold that most people were freezing, except for me.

Everyone was sitting in baskets and I was on top of the balloon getting ready to slide down on my skysurf board.

Or jumped out of a truck driving on the highway.

(Laughter) Such top-level extreme sports are only possible if you practice step by step and put your skills and knowledge to good use.

Of course, I need to be in very good physical condition, so I train a lot.

You should have the best possible equipment.

And perhaps most importantly, you need to work on your mental skills, your mental preparation.

All this to get as close as possible to mankind's dream of being able to fly.

So heading into 2009, I'm training hard for two new projects.

First, I want to set a world record for flying off a cliff in a wingsuit.

And I want to set a new record for the longest distance ever flown.

For my second project, I have a sensational idea for a jump that has never been done before.

Now, as you can see from the video below, I am much better at flying a wingsuit than I am in English.

Enjoy and thank you very much.

(Applause) (Applause) June Cohen: I have a few questions.

I'm sure you all have some questions.

Question 1: So what does the dream of flying actually feel like?

Because it looks like it will.

Ueli Gegenschatz: Yes. I think this is probably the closest possibility to the dream of being able to fly.

JC: I know the answer to this, but how do you land?

UE: A parachute. You have to open your parachute seconds before impact.

(Laughter) It's still impossible to land a wingsuit.

JC: Not yet. But people are trying. Are you among those who are not going to commit either, but are doing so?

UE: It's a dream. It's a dream yes.

We are still developing and developing wingsuits to improve performance and gain more knowledge.

and immediately believe.

JC: Okay. Well, we'll keep an eye on this space. But I have two more questions.

What the heck -- the exhaust was coming out of the back of the wingsuit. Were you wearing a propeller wingsuit?

UE: No. It's just smoke.

JC: Are you going crazy?

(laughter) UE: I hope not.

(laughs) JC: That's dangerous.

UE: No, there are two reasons for smoke. I can see the speed and I can see the road I was flying.

That's the number one reason. Reason #2: Smoke makes it much easier for photographers to shoot.

JC: Oh, I see. Wingsuits are therefore intentionally set to emit smoke, allowing them to be tracked. Another question.

What do you do to hide your face?

Because all I can think about is running so fast and having my whole face squashed backwards.

do you wear a helmet? do you have goggles?

UE: The purest and best feeling is to use only goggles.

JC: So do you always fly like that?

UE: I usually wear a helmet. In the mountains I always wear a helmet because of the landing. Usually it's difficult, but unlike regular skydiving, it requires a massive landing.

Therefore, you should be prepared.

JC: Yes. Is there anything you don't want to do now?

Do people ever come to you with projects and say, "I want you to do this!"?

Have you ever said, "No, I don't mean that"?

UE: Oh, of course, of course. Some people have crazy ideas, and -- (laughter) JC: ...applause...

(Applause) UE: Thank you.

(applause)

I was commissioned by Wilsonart International, the world's largest plastic laminate company. In 2000, I was asked to design a trade fair booth for the International Contemporary Furniture Fair in New York.

So after looking at the three main markets for their product, basically transportation design, interiors and furniture, they came up with the solution of taking an old Airstream trailer, gutting it and giving the laminate and trailer a fresh new contemporary look.

When this trailer showed up at my store in Berkeley, I had never actually set foot in an Airstream trailer or any other.

So I can be the one who can see this in a whole new light and see if it can be optimized in the most ideal way.

I decided I really needed to do some research and figure out what had gone wrong somewhere in Airstream history.

What I discovered in these interiors is that there is a disconnect between the outer shell of the piece and the inner structure.

That shell was originally conceived as a lightweight, modern, futuristic tech pod for zipping along the highway, and the interior was completely out of sync with it.

In fact it seemed to refer to a mountain hut.

It really seemed like a crisis to me. It's how they failed to develop the vocabulary of escape, travel, and modernity in this trailer that matches Shell.

We needed to do some archeology on the trailer itself to understand what the Airstream trailer is about and what feels like it has real purpose and utility.

I removed all the vinyl and Zolaton paint that was covering this amazing aluminum shell.

We removed all visible hardware and trim like a country shed.

I literally drew a picture on the wall of the trailer, imitated it with cardboard, we went in, cut it, decided things were wrong, pulled it out, put it back in.

The main goal was to smooth out the interior and start talking about movement, mobility and independence.

The biggest difficulty with one of these trailers is that they are in a continuous format, so there is no logical place to stop or start materials while you are actually designing.

Nothing like two walls and a ceiling together that can change material and shape.

So it became a challenge.

In addition to that, I was trying to emphasize that the material of choice, laminate, only bends in two dimensions.

Interior with compound curves.

All I had to devise was a way to make people believe that all these panels were curved with the shell.

What I came up with was basically a series of second skins floating over an aluminum shell.

So what I was trying to do was look at the space so that we could perceive the geometric patterns in a different way and not let the casework divide the space.

It also gave me a way to power and rewire my trailer without tearing the hull, so it works as an electrical chase.

The trailer is now almost complete.

That trailer led to another commission to participate in something called the Tokyo Designers Block.

A furniture design event will be held in Tokyo for a week in October.

Teruo Kurosaki, who runs a furniture company called IDEE, asked me to send two trailers to Tokyo.

He said he wanted to build a real trailer that worked, so he would sell it.

Trailer #2, you have a blank slate and can do whatever you want.

We came up with a fanciful scenario where a DJ travels around the US collecting records and going on tour.

The trailer contained two turntables, a mixer, wet bar, refrigerator and integrated sound system.

It had a large sofa that could seat quite a few people and we basically had a great time on it.

So in this trailer, we thought about travel and escape in a unique way.

Many of these ideas were reflected in the Airstream production trailer.

This goes back to when I started consulting with Airstream.

They came to me and said, "So what can we do to make this problem new?"

Besides, do you think skateboarders, surfers, rock climbers and other kids use these things? ”

And I said, "Well, not in that room."

(Laughs) Anyway, I went to the Airstream about six times in the process of making this prototype. It's called the Bambi Prototype.

I thought: "Finally, oh, it's such a big company. You're going to work with someone who has money for molds and molding."

And I visited their prototyping facility and it was exactly like my shop, just bigger, same tools, same stuff.

So the problem is they put this dilemma on me. It means you have to design the interior using only existing technology, and you don't have the money to spend on tools and mouldings.

The trailer itself is actually handmade.

All the casework is uniquely hand-written, so you can't cut 100 parts for 100 trailers, you have to cut it big, and everything is hand-installed.

They didn't want to move to a componentized system.

And that's Bambi 16.

(applause)

I thought I'd start with the war scene.

Few warned of the dangers ahead.

Iraqi rebels have meticulously planted IEDs, improvised explosive devices, along roadsides.

By 2006, more than 2,500 such attacks occurred each month and were the leading cause of casualties among US soldiers and Iraqi civilians.

The team searching for this IED is called the EOD team (Ordinance on Explosive Ordnance Disposal), and they are the spearhead in America's efforts to defuse these roadside bombs.

Each EOD team conducts about 600 such bomb calls each year and defuses about two bombs per day.

Perhaps the best sign of how valuable they are to the war effort is the $50,000 bounty placed on the head of one EOD soldier by the Iraqi rebels.

Unfortunately, this call did not end well.

The bomb detonated in a wave of flames when soldiers got close enough to see the wires that marked the bomb.

Now, depending on how close you are and how much explosives are packed in that bomb, it can cause death or injury. You have to be 50 yards away to avoid it.

The blast is so powerful that it can break a limb even if it doesn't hit.

The soldier was on top of the bomb.

And when the rest of the team stepped forward, it turned out they had very little left. And that night the unit commander performed a sad mission, wrote a letter of condolence to the United States, and told him how painful the loss of his unit was, the fact that he had lost one of his bravest soldiers, one who had saved his life many times.

I apologized for not being able to take him home.

But then he spoke of the glimmer of hope he got from defeat.

"At least when a robot dies, you don't have to write to its mother," he writes.

The spectacle sounds like science fiction, but it's already a reality on the battlefield.

The soldier in this incident was a 42-pound robot called Packbot.

The Secretary's letter was sent not to the Iowa farmhouses you see in old war movies, but to iRobot, a company named after Asimov's novels and not-so-great Will Smith films, and... well... (laughter)...

Remember how in that fictional world robots began performing mundane chores and then taking on life-or-death decisions?

That is the reality we face today.

What we're trying to do is actually flash behind me a series of photos that show the reality of robots being used in warfare that are currently or already in the prototype stage.

It's just for you to taste.

In other words, there won't be anything using Vulcan technology or teenage wizard hormones.

All this is real. So let's go ahead and start these pictures.

Something big is happening today in war, and even in human history itself. The US military flew several drones and marched into Iraq.

There are currently 5,300.

We have introduced an unmanned ground system with zero. There are currently 12,000.

And the technical term "killer application" is taking on new meaning in this space.

And remember, we're talking Model T Ford, Wright Flyers compared to what's coming soon.

That's where we are now.

One of the guys I met recently was a three-star general in the Air Force, and he basically said that where we're headed soon is tens of thousands of robots operating in conflicts, and those numbers matter, because we're not just talking about tens of thousands of robots today, but tens of thousands of prototypes and robots of tomorrow, because one thing that's going on with technology is, of course, Moore's Law, and you can pack more and more computing power into those robots. Going back about 25 years, if Moore's Law holds true, the computing power of these robots will be nearly a billion times more powerful than it is today.

That means things that were previously only talked about at sci-fi conventions like Comic-Con must be talked about in places like the Halls of Power and the Pentagon.

The robot revolution is coming.

Now, I need to be clear here.

I'm not talking about the Terminator kind of revolution where you have to worry about the governor of California showing up on your doorstep. (Laughter) When historians look at this period, they will conclude that we are in for a different kind of revolution, a revolution in warfare like the invention of the atomic bomb.

But it can be even bigger, as our unmanned systems affect not only the 'how' of combat, but also the 'who' of combat at the most basic level.

So every revolution in warfare so far, whether it's machine guns or atomic bombs, has been about systems that fire faster, reach farther, and produce bigger booms.

That's certainly the case with robotics, but robots change a warrior's experience and even his very identity.

To put it another way, 5,000 years of mankind's monopoly on warfare is crumbling in our lifetime. Over the last few years, I've met with everyone in the field, from robotics scientists to the science fiction writers who inspired them, to the 19-year-old drone pilots fighting in Nevada, to the four-star generals who command them, and even the Iraqi rebels they're targeting, to see what they think of our system. What I find interesting is not only their stories, but how their experiences show the ripple effects that extend beyond our society, the law, and society. our ethics, etc. So what I want to do with the rest of my time is basically flesh out some of these things.

First of all, the future of warfare, even robotics, will not be purely American.

Today, the United States is leading the way in military robotics, but we know there is no such thing as a lasting lead or edge in technology.

Let's just raise our hands. How many people in this room are still using Wang Computer? (Laughter) Same with war. England and France invented the tank.

The Germans figured out how to use it right, so what you have to think about the US is that they are ahead at the moment, but there are 43 other countries working on military robotics, including Russia, China, Pakistan, Iran, and other interesting countries all included.

And this raises an even bigger concern for me.

Given the state of our manufacturing industry and the state of science and mathematics education in schools, how should we proceed with this revolution?

Or another way of thinking about this is what it means to be increasingly at war with soldiers whose hardware is made in China and whose software is written in India.

But just as software has become open source, so has war.

Unlike aircraft carriers and atomic bombs, you don't need a massive manufacturing system to build robotics. Many of them are off the shelf. Many of them even do it themselves.

One of the things that flashed in front of me was a hand-held tossed crow drone. For about $1,000, you can build your own equivalent to what Iraqi soldiers use.

This creates new problems when it comes to wars and conflicts. Good people may play with and craft hobby kits, but so may bad people.

This intersection of robotics and things like terrorism is going to be both fascinating and unsettling, and we've already seen it begin.

During the war between state Israel and non-state actor Hezbollah, non-state actors flew four different drones against Israel.

A jihadist website already exists that allows you to remotely detonate an IED in Iraq from the comfort of your home computer.

So I think you'll see two trends happening with this.

First, it will increase the power of individuals over governments. Second, it will expand the realm of terrorism.

That future may be a combination of Al Qaeda 2.0 and the next generation Unabomber.

Another way to think about this is that you don't have to convince the robot to accept 72 virgins after death in order for it to self-destruct.

But this ripple effect will also spill over into our politics. One of the people I met was Ronald Reagan's former assistant secretary of defense, and he said, “I like these systems because they save American lives, but I worry that ignoring the cost debate will make the war more marketable, creating more stories of shock and awe.

People are more likely to support the use of force if they think it costs nothing. ”

Robots, for me, take certain trends that already influence our body policies, and perhaps bring them to their logical destination.

No drafts. No more declarations of war.

We no longer buy war bonds.

And now there's the fact that we're increasingly turning American soldiers into machines that send us in dangerous directions, and that we might bring soldiers who have already lowered the bar to war and drop them to the ground.

But the future of war will also be a YouTube war.

So our new technology doesn't just remove humans from risk.

They also record everything they see.

In other words, they are not just severing ties with the masses, they are rebuilding the relationship between war and the people.

YouTube now already has thousands of video clips of the fighting in Iraq, most of which were collected by drones.

Now this could be a good thing.

Links between the domestic front and the front could be built like never before.

But remember. This is happening in our strange and bizarre world, so the ability to download these video clips to your iPod or Zune will inevitably turn it into entertainment.

Soldiers name these clips.

They call it war porn.

A typical email I received was an email with a video attached showing the Predator raiding an enemy stronghold. The missile hits and the corpse scatters in the air with the explosion.

It was set to music.

It's set to Sugar Ray's pop song "I Just Want To Fly."

This ability to see more and experience less creates wrinkles in the relationship between people and war.

Think of it like a sport.

It's like the difference between watching an NBA game or a professional basketball game on TV, where the athlete appears as a tiny person on the screen, but watching that basketball game in person and understanding what a 7-foot tall person actually looks like.

But remember, these are just clips.

These are just the ESPN SportsCenter version of the game. they lose their context.

They lose their strategy.

they lose their humanity. War becomes just slam dunks and smart bombs.

Now, the irony of all this is that future wars may involve more and more machines, but it is our human psychology that drives all this, and it is our human failures that are causing these wars.

So one example of this that has great resonance in the policy arena is how this plays out into a very real ideological war in which we are fighting extremist groups.

What messages do you think these machines are sending and what messages are being received in terms of messages?

So, one of the people I met, a senior Bush administration official, had this to say about the unmanned war: "It's our strength. It's our technology that scares people."

But when you go to Lebanon, for example, and meet people, it's a completely different story. One of the people I met there was a news editor, and I was talking to him while the drone was flying over him, and this is what he had to say.

"This is just a sign that the ruthless and brutal Israelis and Americans are sending machines to fight us. They are cowards.

They don't want to fight us like real men, but they are afraid to fight, so you have to kill a few soldiers to defeat them. ”

Future of War also introduces new types of warriors and really redefines the experience of war.

You can call this a cubicle warrior.

Here's what one Predator drone pilot told about his experience fighting in the Iraq War without ever leaving Nevada.

"You go to war for 12 hours, you shoot weapons at targets, you kill enemy combatants, you get in your car, you drive home, and within 20 minutes you're sitting at the dinner table talking to your kids about homework."

Now, balancing these experiences psychologically is incredibly difficult, and in fact these drone pilots have a higher incidence of PTSD than many units physically in Iraq.

But some worry that the disconnect will lead to something else, that the distance will make it much easier to think about war crimes. One young pilot told me that attacking enemy forces from a distance was "like a video game."

As anyone who has played Grand Theft Auto knows, we do things in the video world that we wouldn't do in person.

A lot of what you hear from me is that there is another facet to the technological revolution that is shaping our present, and perhaps will shape the future of our warfare.

Moore's Law is valid, but so is Murphy's Law.

The fog of war has not cleared.

Enemies have the right to vote.

While we are gaining amazing new capabilities, we are also facing and experiencing new human dilemmas. Now, sometimes these are just "oops" moments. The head of a robotics company put it there, only to have an "oops" moment. So what is a robot "oops" moment in war?

Well, sometimes it's funny. Sometimes it was like that scene from Eddie Murphy's "Best Defense" came to life, a machine gun-equipped robot was tested, and during the demonstration the robot started to circle and point the machine gun at the VIP judging table.

Luckily the weapon was unloaded and no one was injured, but the "oops" moment can be tragic, as last year in South Africa there was a "software glitch" in an anti-aircraft gun that actually switched on and fired, killing nine soldiers.

There is a new wrinkle in the laws of war and liability. What about unmanned slaughter?

What is Unmanned Slaughter?

There have already been three instances of Predator drones attacking locations thought to have captured Bin Laden, but this was not the case.

And this is where we are now.

Nor are we talking about an armed autonomous system with full authority to use force.

And don't believe it won't come.

During my research, I came across four different DoD projects on various aspects of it.

So you're asking: What does this mean for issues like war crimes? Robots have no emotions, so they don't get upset when their companions are killed.

They do not commit crimes of anger or revenge.

But robots don't have feelings.

They see an 80-year-old grandma in a wheelchair the same way they see a T-80 tank. Both are just sequences of 0's and 1's.

So we have a problem to solve. 20th-century laws of war are old enough to be covered by Medicare today, but how do we keep up with 21st-century technology?

In conclusion, I talked about what the future of war might look like, but please note that I used only real world examples and only looked at real world photos and videos.

So this is a big challenge for all of us, and we have to worry before we worry that the Roomba will suck your life out.

Are we going to keep denying ourselves the fact that what is now being revealed in war sounds like science fiction?

Are we going to face the reality of 21st century warfare?

Are our generations going to make the same mistakes that past generations have made regarding nuclear weapons and not address the issues surrounding them until Pandora's box has already been opened?

Now, I could be wrong on this one, but one Pentagon robotics scientist said I was wrong. "There are no real social, ethical or moral issues with robots," he said.

That is, "unless the machine kills the wrong people repeatedly," he added.

Then it becomes just a product recall issue. ”

And the end of this matter is really looking to Hollywood.

A few years ago, Hollywood put together all the top characters to create a list of the top 100 heroes and top 100 villains in Hollywood history, characters representing the best and worst of humanity.

Only one character made it onto both lists. It's the Terminator, a robotic killing machine.

It points to the fact that our machines can be used for good or evil, but to me it points to the fact that humans also have two sides.

This week is a week to celebrate our creativity. Our creativity has taken our seed to the stars.

Our creativity has produced works of art and literature to express our love.

And now we're using our creativity in certain directions to build amazing machines with incredible capabilities, and one day a whole new breed may be born.

But one of the main reasons we do things like that is because of our urge to destroy each other. So the question we all should ask is is it our machine or is it geared up for war?

thank you. (applause)

Silicon Valley and the Internet have given me super powers, tools to go to battle, suits to withstand bullets, and giant signals in the sky that tell me when it's time to fight.

Well, you can't really prove this.

I'm not a 'scientist' and I don't have 'facts'.

In fact, my Rotten Tomato score is currently around 50%, so I don't understand why they included me.

(Laughter.) But if you're talking about a conflict with a power greater than ours, I'm in the right position. Because I had an interesting year this year with the movie I was in called Crazy Rich Asians -- (applause and cheers) Thank you, thank you.

And I know my story is only possible thanks to the collection of connections that have happened throughout my life, so hopefully telling a little bit of my story will help someone else find their way a little sooner than I did, especially if we're talking about connections today especially.

My story begins when I first opened my scriptures...

Gadget scripture, of course, "Sharper Image".

(laughs) Yes, who knows.

It was a dreamy, magical magazine, with things in it that I knew couldn't be, but it was right there.

You can order it -- please mail it to me.

And some that probably shouldn't have existed. For example, Gregory, a lifelike portable mannequin whose strong, masculine appearance deters crime.

This is real -- (Laughter) By the way, this is real.

(Laughs) But my eyes were on Sima Video Ed/it 2.

This was cool when I was 10.

I called my parents and convinced them to buy me this because I could hook up all my VHS players and cut something together.

Before I get to the point, let me tell you a little bit about my parents.

They came to the US at a young age, hail from Taiwan and China, and settled in Los Altos, California (Silicon Valley before Silicon Valley), where they started a restaurant called Chef Choose.

After 50 years they still work in the restaurant and are still there and I grew up there too so it was great.

Let's talk about connections -- this place was a hub of connections.

People who come there to celebrate their ties such as birthdays, anniversaries, business deals, dining and drinking.

And I had to grow up in that environment.

And my parents always said America was the most wonderful place in the world.

You can. If you love something, you can work hard and achieve anything you want.

So they raised five American children.

I'm the youngest and you can see it's me with closed eyes, but they actually named my sister and I Jennifer and Jonathan Hart, after Jennifer and Jonathan Hart from that TV show, Heart to Heart.

(Laughs) It seems that they loved America that much.

And they thought we were the Kennedys, especially my mother, so they always dressed us alike, sent us to etiquette classes, ballroom dancing classes, made sure we had the right dental plans -- (laughter) here's the real picture of me. it's not fake.

Thank God for that.

And I was in charge of the camcorder every time I went on vacation, so I was collecting all the videos and had nothing to do with it.

So, Sima Video Ed/it 2.

I persuaded them to buy it for me and spent all night struggling through all the VCRs in my brother's and sister's rooms tangled in wires. And now I have something to show them.

So one night I took them into the living room. I think it was probably around 1991. Somewhere around the corner, I sat them in the living room. My heart was pounding and my breathing was deep. I feel the same as I do now. And when I hit the play button, something really weird happened.

they cried.

and cried.

They cried not because it was the best home video compilation ever (even if it was pretty good) (laughter), but because they saw us as a normal family that blended into their screens and belonged, just like the movie they adored and the TV show we're named after.

As the youngest of five children, I remember feeling heard for the first time.

There was a place where all these things in my head could flow, exist, and escape into some great, electrical space outside. And from this moment on, I knew I wanted to do this for the rest of my life, regardless of whether I got paid or not.

So I had a passion, but now I needed some tools and my dad went to work.

He continued to brag about my home video editing skills to Chef Chu's customers. Luckily, this is Silicon Valley, so they are working on hardware and software. These are all engineers.

And they offered to give me one for digital video editing.

This is like the mid-90s early 90s when nothing like this existed for kids like me.

So you'll get this beta software and hardware from HP, Sun, Adobe's Russell Brown, and others.

I didn't have a manual, so I figured it out on my own and fell in love with it even more.

I enrolled and started attending USC School of Film Arts, but my father and mother would always call me randomly to remind me that I had to make a film about Chinese traditions.

China will one day become a huge market for movies.

I was like, "Yeah, guys."

(laughs) Always listen to your parents.

(laughs) I wanted to be Zemeckis, Lucas, Spielberg.

The last thing I wanted to talk about was my own cultural identity, my ethnicity.

And to be honest, I had no one else to talk to. There was no one at school that I could really trust. Even if I could, what would I say?

So I ignored it and got on with my life.

15 years later, I am successful in Hollywood.

I was discovered by Spielberg and worked with The Rock, Bruce Willis and Justin Bieber.

I also came on stage at TED to present my dance company LXD and it was amazing.

And a few years ago, I felt a little lost on the creative side.

The engine dropped a little and I saw the signs...

I heard a voice from the sky...

It was kind of like a bird.

OK, okay, it was Twitter.

And Twitter -- (laughter) on Twitter it was Constance Wu, Daniel Dae Kim, Jenny Yang here today, Alan Yang -- all these people complaining about their representation in Hollywood.

And I was really shocked.

I was thinking about something like that, but never actually registered. I was really focused. I felt lucky to have the job. And then I realized. So what's wrong with Hollywood?

why don't they do this?

Then I looked in the mirror and realized I was Hollywood.

I literally took my collar off before I even got out of here. That's my Hollywood.

(laughs) Are you still awake? OK.

(Applause.) Over the years, I've felt like I've been given so much, but what have I been able to give back to my beloved film industry?

I felt lucky to be here, but at this moment I realized that I wasn't just lucky to be here, I had a right to be here.

No, I earned my right to be here.

All the sleepless nights, all the parties I missed on Friday, all the friends and girlfriends I lost to editing, I earned the right to be here not just to speak up, but to say something and say something important. And indeed, I had power. It's a superpower that can change things if you really really want to.

It can be scary when you try to talk about yourself and people who look like you and are like your family. Also, all the feelings of being alone came back.

But that was what the internet taught me. I sent a sign that the whole army is waiting for me to support and love me.

So I found Kevin Kwan's excellent novel Crazy Rich Asians and got to work.

We put together this movie.

An all-Asian cast -- the first all-Asian cast in a modern story in 25 years -- (applause and cheers) But that wasn't quite guaranteed when we started.

There were no comps in this kind of movie.

Every time I did a survey or something, the audience never came.

In fact, even at test screenings where free tickets were given out to moviegoers, the ratio was 1:25. So, after asking 25 people, only 1 said yes, which is a very low number for this kind of thing.

Asians who knew about the book didn't trust Hollywood at all, Asians who didn't know the book thought the title was offensive, and other non-Asians didn't think the book was for them.

So we were pretty screwed.

Luckily, Warner Bros. didn't turn a blind eye to us.

But then somewhere the electricity went off again, and an army of Asian-American writers, reporters, and bloggers who had spent years striving for their respective publications set to work without my knowledge.

And they started posting.

Also, some tech founders here have started posting on social media or writing about us in articles for the LA Times, The Hollywood Reporter, and Entertainment Weekly.

It was like a grassroots uprising to make themselves news.

How amazing!

And that surge of support has spawned an online conversation among all Asian Americans where we could actually discuss what stories we wanted to tell, what stories we should or shouldn't tell, and what we were allowed to ridicule.

What about casting? what are we allowed to do?

And we disagreed - and still disagree, but that wasn't the point.

All that matters is that the conversation was taking place.

And this flow of conversation became the infrastructure.

All these different groups trying to achieve the same thing had to bring us all together into this connective tissue.

Again, it's not perfect, but it's the beginning of how we dictate our representation on the big screen.

Going to the cinema made me more physical.

I'll never forget what happened - I went to the theater on opening weekend and it wasn't just Asians - there were all kinds of people - and I sat down and sat down, people laughed, people cried, and when I walked into the lobby, people stayed.

It's like you didn't want to leave.

They just hugged, high fived, took selfies, argued about it, laughed about it.

All these different things.

I had a very close relationship with this movie, but when we were making it, I didn't understand it until it happened. That's how my parents felt that day when they watched a family video in the living room.

There is power in watching us on screen and I can only express my pride in it.

I have always understood this term intellectually. We've probably talked about this term before, but what it actually feels like to be proud, if you've ever felt it, is to just like it and want to touch and grab everyone and run around.

It's very -- I can't explain -- it's just a very physical sensation, and it's all due to long-term patterns of connection.

Film has been a gift given to me and I have learned a lot over the years.

You can plan, you can write the screenplay, you can write the storyboard, but at some point your movie will speak to you, and it's your job to listen.

It's a living organism and exists on its own, so you need to catch it before it slips through your grasp. That's the most exciting part of making a movie.

If you look at life, it doesn't really change that much.

I have been guided through this breadcrumb of connections through people, through circumstances, through luck.

And that changed when I realized that once I started listening to the quiet beats and messy noises around me, I realized that this beautiful symphony was already written for you.

A straight line to your destiny.

your super power.

Well, movies were a gift given to me, pushed by my parents and supported by the community.

I had to be who I wanted to be when I wanted to be.

My mom posted something on Facebook the other day that's really bad to say out loud usually -- you shouldn't have Facebook because it's scary -- (Laughter) She posted this and it's a meme and, you know, one of the funny things is, "You can't change someone who doesn't want to change, but you should never underestimate the power of planting a seed."

And as I was putting the finishing touches on this talk, I realized that all the powerful connections in my life are through generosity and kindness, love and hope.

So when I think about the movies I'm working on right now, Crazy Rich Asians and In The Heights -- (applause and cheers) Yes, it's a good movie.

All I want to do is show them joy and hope. Because we don't want to believe our best days are past, but in reality, it's just around the corner.

because you can see love Love is my superpower.

Love is a superpower given to me.

Only love can pick up speed and stop the bullet before it flies out.

Only love can have the courage to jump over buildings, to bring whole communities to the skies, hold hands, and stand up to something impossibly bigger than themselves.

So there is a challenge for myself and for everyone here.

As you work on your job and company, making this happen and making the impossible possible, remember to be kind to each other. Because I believe that is the most powerful form of connection we can give to this planet.

In fact, our future depends on it.

thank you.

(Applause and cheers) Thank you.

(applause)

One of the things I wanted to say about filmmaking, about this movie, is to think about the wonderful talks that Michael Moeshen heard here, and the talks about music, the idea that stories exist and music exists in time.

Movies also exist in time. It is an experience to be experienced emotionally.

And in making this film, I felt that most of the documentaries I've seen have been driven by learning, knowledge, or talking heads and ideas.

And I wanted the film to be emotionally driven and really follow my journey.

So instead of doing a talking head thing, it's instead made up of scenes, meeting people along the way.

I only meet them once.

They don't come back again and again, so it's really a record of the trip.

It's like life that once you get in you can't get out.

I have two clips that I would like to show you. The first clip is kind of a hodgepodge, just 3 and 4 little moments of the 3 of us here tonight.

Not so in the movies, as they are part of a much larger scene.

They play each other in great ways.

And it ends with a little clip of his father, Lou, talking about something so important to him: the coincidences of life.

I think he felt that the best things in life happened by chance and perhaps weren't planned at all.

And these three clips are followed by a scene of a building in Dhaka, Bangladesh, which is probably his biggest construction for me.

He built his capital there.

And I hope you enjoy this building. I have never seen this building before. It was photographed, but was never captured by a film crew.

We were the first film crew there.

You will see an image of this wonderful building.

There are a few things to keep in mind when looking at this. It is built entirely by hand and I believe they introduced a crane last year.

It was constructed entirely by hand from bamboo scaffolding, where people placed baskets of concrete on their heads and threw them into the formwork.

It's the capital of the country, it took 23 years to build and they seem very proud of it.

It took as long as the Taj Mahal.

Unfortunately, it took so long that Lou never got to see it finished.

He died in 1974.

The building was completed in 1983.

So it continued for years after his death.

When you look at that building, think about how some of our hardest things in life can never be completed.

And it really made an impression on my father. In the sense that he had a strong belief that by doing these things the way he gave them, in some way, something good would come out of it, even in the middle of a war, at one point there was a war with Pakistan and construction stopped completely, but he kept working. Because I felt, "When the war is over, we will need this building."

So let me introduce you to these two clips.

Please roll that tape.

(Applause) Richard Saul Wurman: I remember listening to him in pen.

And when I got home, I said to my father and mother, "I just met this guy, he doesn't do much work, he's kind of ugly and has a weird voice, and he's a schoolteacher.

I know you've never heard of him, but just for this day just remember that one day you'll hear about him, because he's such an amazing person. ”

Frank Gehry: I heard he had something to do with Ingrid Bergman. TRUE?

Nathaniel Khan: If so, he was a very lucky man.

(laughs) NK: Did you really hear that?

FG: Yes, when he was in Rome.

Moshe Safdie: He was a true nomad.

And when I got to know him when I was in the office, he came back from a trip, stayed in the office for a couple of days intensively, packed up and left.

He was in the office until 3am working with us, but there was a certain nomadic feeling in him.

So, as tragic as his death was at the station, it was very much in line with his life.

I mean, I often wonder if I'm going to die on the plane, or I'm going to die at the airport, or I'm going to die while jogging without my ID.

I don't know why I keep having such things from his dying memory.

But he was a nomad at heart.

Louis Kahn: Our existence is truly accidental and full of circumstantial influences.

Man: We are morning workers and come here all the time to enjoy the walks and the beauty and atmosphere of the city. This is the nicest place in Bangladesh.

we are proud of it.

NK: Are you proud of it?

Man: Yes, that is the national image of Bangladesh.

NK: Do you know anything about architects?

M: Architect? I've heard of him. He is a first-class architect.

NK: Well, actually I'm here because I'm the son of an architect and he was my father.

Man: Oh! Is your father Louis Farrakhan?

NK: Yes. No, not Louis Farrakhan, not Louis Kahn.

Man: Louis Kahn, yes!

(laughter) Man: Is your father alive?

NK: No, it's been 25 years since he passed away.

Man: It's great to see you again.

NK: Thank you.

NK: He never saw it finished, Pop.

No, he never saw this.

Shamsul Wares: It was almost impossible to build for a country like ours.

Thirty, fifty years ago it was nothing, just paddy fields, but because we invited him here, he felt responsible for himself.

He wanted to be Moses here, so he gave us democracy.

He's not a politician, but in this guise he gave us the institutions of democracy to stand up for.

In that sense they are very relevant.

He didn't care how much money there was in this country or whether he could finish this building, but somehow he could do it here and he could build it.

And this is the biggest project he has done here in the poorest country in the world.

NK: It cost him his life.

SW: Yes, he paid. He paid his life for this, which is why he is great and we will never forget him.

But he was human too.

At present, his inability to satisfy his family life makes it inevitable that he associates with great people.

But I think your son will understand that and will not hold any grudges or feelings of being ignored.

He cared in a completely different way, which took me a lot to figure out.

In the social aspect of his life, he was just like a child, not mature at all.

He couldn't say no to anything, which is why he couldn't say no to anything and got this building today.

Only then can you understand him.

There is no shortcut to really understanding him.

But I think he gave us this building, and we always feel for him, so he gave us love.

He probably couldn't give you guys the right kind of love, but he gave people the right kind of love for us, and that's important.

You have to understand it.

He had an enormous amount of love and loved everyone.

Loving everyone, he sometimes did not meet those closest to him, but that is unavoidable for a man of his stature.

(applause)

When we sequenced the human genome in 2003, we thought we might have answers for treating many diseases.

But the reality is far from that. This is because, in addition to our genes, our environment and lifestyle may play an important role in the development of many major diseases.

One example is fatty liver disease. Fatty liver disease affects more than 20% of the world's population, has no cure, and leads to liver cancer and liver failure.

Therefore, DNA sequencing alone does not provide enough information to find effective treatments.

On the bright side, there are many other molecules in our bodies.

In fact, there are over 100,000 metabolites.

A metabolite is any molecule that is very small in size.

Known examples are glucose, fructose, fat, cholesterol, and others we hear a lot about.

Metabolites are involved in our metabolism.

They are also downstream in DNA, so they carry information from both your genes and your lifestyle.

Understanding metabolites is essential for finding cures for many diseases.

I have always wanted to treat patients.

Nevertheless, 15 years ago, I dropped out of medical school because I missed math.

Soon after, I discovered the most amazing thing. It means that you can study medicine using mathematics.

Since then, I have been developing algorithms to analyze biological data.

So it sounded easy. Let's collect data from all the metabolites in our bodies, develop mathematical models that describe how they change in disease, and intervene and treat those changes.

That's when I realized it was very difficult why no one had done this before.

(Laughter) We have a lot of metabolites in our bodies.

Each one is different than the other.

For some metabolites, mass spectrometry can be used to determine molecular weight.

But since there could be 10 or so molecules with exactly the same mass, we never know exactly what they are. If we want to pinpoint everything definitively, we need to do more experiments, which could take decades and billions of dollars.

So we developed an artificial intelligence (AI) platform to make it happen.

We have leveraged the growing body of biological data to build a database of existing information on metabolites and interactions with other molecules.

We combined all these data as a meganetwork.

Then, the mass of metabolites is measured from the patient's tissue or blood to find the mass that has changed due to the disease.

But like I said, I don't know exactly what they are.

The 180 molecular weight could be either glucose, galactose, or fructose.

They all have exactly the same mass, but have different functions in our body.

Our AI algorithm considered all these ambiguities.

We then mined that meganetwork to see how those metabolic clusters are interconnected and cause disease.

And how they are related allows us to deduce what the mass of each metabolite is, such as here 180 could be glucose, and more importantly, discover how changes in glucose and other metabolites lead to disease.

This new understanding of disease mechanisms will make it possible to discover effective therapies that target them.

So we founded a startup to bring this technology to market and impact people's lives.

My team at ReviveMed and I are currently working to find cures for major diseases where metabolites are the main cause, such as fatty liver disease. This is because fatty liver is caused by the accumulation of fat, a type of metabolite in the liver.

As I said earlier, this is an epidemic with no cure.

Fatty liver disease is just one example.

In the future, we plan to tackle hundreds of other diseases for which there are no cures.

And by collecting more and more data on metabolites and understanding how metabolite changes lead to the development of disease, our algorithms will get smarter and better able to find the right treatments for the right patients.

And we are even closer to achieving our vision of saving lives with every line of code.

thank you.

(applause)

Malaria remains one of the deadliest deaths on the planet.

Although we have made great strides in the last two decades, half the world's population is still at risk from the disease.

In fact, every two minutes a child under the age of two dies of malaria.

Our progress has definitely stalled.

We face many challenges in malaria control today, but one of the problems we have is finding people with malaria in the first place.

For example, if people have some immunity to the disease, they may develop the infection, be contagious, and still be infected, but may not actually develop symptoms. It can be a big problem. Because how do you find such people?

It's like looking for a needle in a haystack.

Well, scientists have been trying for years to solve this problem, but what I want to tell you today is that the solution to this problem may have been before us all along.

It was a bit of a heavy start with a lot of really important stats. I would like everyone to relax a little. It also allows me to relax a bit.

Let's all take a deep breath...

oh. (Laughter) And then you sigh and, oops, you'll be blown away right there.

Yes, I want you to do it again, but this time I want you to do it only with your nose. We want you to really feel the environment around you.

And in fact, try to actually smell the person sitting next to you.

I don't care if you don't know them.

Lean over and put your nose directly into your armpit. So stop being British, stick your nose in your armpit, sniff the old fashioned way, and see what you smell like.

(Laughter.) Each of us would have had a very different sensory experience there.

Some of us have probably smelled some pretty pleasant smells, such as someone else's perfume.

However, some of us may have experienced a slightly unpleasant odor, such as someone's bad breath or body odor.

Maybe you've even smelled your own body odor.

(Laughter) But there are probably good reasons why some people don't like certain body odors.

Throughout history, there have been many examples of odors being associated with illness.

For example, typhoid fever smells like burnt brown bread. It smells so good, doesn't it? But little by little it starts to get worse.

Tuberculosis smells like stale beer, and yellow fever smells like raw meat in a butcher shop.

And indeed, if we look at the kinds of words used to describe disease, we often find words like "rotten," "dirty," "rotten," and "irritating."

So it's no surprise that they get a bit of a bad reputation for smell and body odor.

If I said to you, "You stink," you wouldn't take it as a compliment at all.

But you smell it.

It's a scientific fact.

And I want to flip it over.

What if you could actually think positively about smell and use it to your advantage?

What if we could detect the chemicals released by the body when sick and use them to diagnose people?

We need to develop better sensors that will allow us to do this, but it turns out that the world's best sensors actually already exist, and they're called animals.

Now animals are made to smell.

They live their daily lives according to their noses.

They sense their environment and basically convey very important information for survival.

Imagine that you are a mosquito that flew in from the outside and entered this room.

You are about to enter a really complicated world.

You will be attacked by the smell from everywhere.

It turns out we are really stinky beasts.

Each of us produces different volatile chemicals.

There are many chemicals, not just one such as BO.

But you are not the only one. The seat you sit on, the carpet, the glue that holds the carpet to the floor, the paint on the walls, and the trees outside are also a problem.

Everything around you is giving off odors and there is a really complicated world for mosquitoes to fly around and they have to find you in that really complicated world.

And each of you will know - come on, raise your hand, who always gets mosquito bites?

And is there anyone who never gets bitten?

There is always one or two really annoying people who never get bitten.

But it is very difficult for mosquitoes to find you and it all has to do with your smell.

People who keep mosquitoes away smell repellents, and what we do know is that -- (laughter) let me be clear, repellents are for mosquitoes, not people.

(Laughter) And what we now know is that it's actually genetically controlled.

But mosquitoes can do that because they have a very sophisticated sense of smell, they can see through all the smelly sludge and find you and prick you as blood powder.

But what if one of you got malaria?

Now let's take a quick look at the life cycle of malaria.

It's very complicated, but basically, if a mosquito doesn't bite someone, it doesn't get infected.

When bitten by an infected person, the parasite enters the intestine through the mouthpiece, ruptures the intestine and forms a cyst, then the parasite replicates and travels from the intestine to the salivary glands, where it is injected into another person as the mosquito injects saliva when bitten.

Then, in the human body, it goes through a whole other cycle, a whole other part of the life cycle, goes through stages in the liver, changes shape, reenters the bloodstream, and finally the person develops an infection.

Well, one thing we do know about the parasite world is that they are very good at manipulating their hosts to reinforce their own contagion and ensure that they are contagious.

If this happened in the malaria system, it might make sense that it has something to do with the odors they manipulate, since odor is key.

Smell is what connects us to mosquitoes.

This is what we call the malaria manipulation hypothesis, and it's something we've been working on over the last few years.

So one of the first things we wanted to do in our research was find out if malaria actually makes people more susceptible to mosquito bites.

So in Kenya, I collaborated with a colleague to plan an experiment in which the participants, Kenyan children, slept in tents.

Mosquitoes react behaviorally when the smell from a tent is blown into a room with mosquitoes.

They will fly towards or flee from the smell depending on whether they like the smell or not.

Some of the participants had malaria, some did not, but importantly none of the children had any symptoms.

Well, when I found and saw the results, it was truly amazing.

Those infected with malaria were significantly more attractive than those who were not.

Now let's talk about this graph.

I have "number of mosquitoes attracted to children" and I have two data sets, before treatment and after treatment.

The leftmost bar represents the group of uninfected people, and as you move to the right, these people are infected and moving towards the infectious stage.

Therefore, the stage at which people are contagious is when they are significantly attractive.

In this study, what we did was obviously treat the children to remove the parasite, then test them again, and we found that a very attractive trait that was there disappeared after the infection was removed.

So not only were people more attractive, but somehow the host was being manipulated to make it more attractive to mosquitoes so that the parasite could continue its life cycle and stand out like a beacon to attract more mosquitoes.

The next thing we wanted to do was find out what the mosquitoes actually smelled like.

To do so, it was necessary to collect body odors from participants. Volatile odors could be collected from participants' feet by wrapping bags around them. Feet are very important to mosquitoes.

They really love the smell of their feet.

(Laughs) Especially the cheesy legs. Anyone with cheap feet over there?

Mosquitoes love that smell.

So I focused on the feet and collected body odors.

Now, when it comes to mosquitoes and the sense of smell, or smell, it's very complicated.

It would be really nice if only one chemical was detected, but it's not that simple.

They need to detect a large number of chemicals at the right concentrations, right ratios, and right combinations of chemicals.

So you can think of it like a piece of music.

In other words, if you misspell a note or play too loud or too soft, it will not sound right.

Or recipes: Wrong ingredients or cooking too long or too little will result in bad taste.

Well, it smells the same.

It consists of a set of chemicals in proper combination.

Our machines currently in the lab are not very good at detecting this kind of signal. Very complicated.

But animals can do it, and in my lab we attach microelectrodes to the antennae of mosquitoes.

Imagine how annoying that would be.

(Laughter) But what we're doing is also connecting them to individual cells in the antenna, which is amazing.

You certainly don't want to sneeze while doing this.

But what will happen is that we will be able to measure the electrical response of the olfactory receptors in the antennae, and we will be able to see what the mosquitoes are smelling.

So let me show you what this looks like.

This is an insect cell. When you press this button, it reacts immediately. You can see that it is ticking with this reaction.

When the scent is infused into the cells, they go a little crazy, sort of like blowing raspberries away, and when the scent is turned off, the cells return to a quiescent state.

(Rapid crackling) (Low crackling) (Rapid crackling) Well, now that you've come home, you can say you've seen and even heard the smell of bugs. It's a strange concept, isn't it?

But this works very well and allows you to see what the insect is detecting.

Using this method on malaria samples, we were able to tell what the mosquitoes were detecting and found that malaria-related compounds, primarily aldehydes (a group of odor-producing compounds), gave malaria signals here.

Now that we know what malaria smells like, we used mosquitoes as biosensors to tell us what malaria smells really like.

Now, I'd love to imagine putting a little mosquito in a harness, taking it out on a leash, and seeing if I could smell people in my community - I think so in my head - and see if I could actually find someone with malaria, but of course that's not really possible.

But there are animals that can do it.

Well, dogs have an amazing sense of smell, but there is something more special about dogs. Dogs are capable of learning.

And most people will be familiar with this concept at the airport. There, dogs line up, sniffing your luggage and yourself looking for drugs, explosives, and even food.

So we wanted to know if dogs could actually learn to smell malaria.

So we've been working with a charity called Medical Sniffer Dogs to see if we can train dogs to learn the smell of malaria.

And then we went to Gambia and collected more odors from infected and uninfected children, but this time we had the children wear socks and nylon stockings to collect their body odor.

And we brought them back to the UK and gave them to this charity to conduct experiments.

Now I could show you the graph and explain that the experiment was successful, but that's a bit boring, isn't it?

It is now said that you should never work with children or animals alive, but we are going to break that rule today.

So welcome Freya to the stage...

(Applause.) And her trainers Mark and Sarah.

(Applause.) Of course, the real star of this show.

(Laughter.) So what I'm going to ask is if you guys could be a little quieter and not move around too much.

This is a very strange environment for Freya.

She's watching you closely now.

So keep your cool as much as possible. That's wonderful.

What we're trying to do here is basically ask Freya to work her way down this chain of gimmicks. Each of these contraptions has an urn containing a sock worn by a Gambian child.

Currently, three of the socks are worn by uninfected children and only one of the socks is worn by a child with malaria.

Imagine this is people and dogs coming down and sniffing, just like you see airports.

And let's see when she senses malaria and if she senses malaria.

This is a very tough test for her in this very strange environment, so I'm going to pass it on to Mark now.

(laughs) Third. OK.

(Applause.) So let's go.

I didn't know which pot it was in. I didn't even know Mark.

It was just a blind test. Sarah, was that right?

Sarah: Yes.

JL: That's right. Well done, Freya. It's amazing. Phew.

(Applause.) That's really great.

Now, Sarah is actually going to change the pots a bit, get rid of the malaria-infected pots, and have four pots filled with the socks of the kids who didn't have malaria. So, in theory, Freya should go along that line and not stop at all.

And this is really important. Because we need to know uninfected people. she should be able to do that.

And this is a difficult test.

This sock sat in the freezer for several years, but it's also a tiny sock.

Now imagine if this was a whole human being emitting a loud signal.

This is really unbelievable.

OK, so Mark.

(Laughter) (Applause) That's great. wonderful.

(Applause.) It's really amazing. Thank you very much to all of you.

Well done guys.

(Applause.) What a good boy. She will get a reward later.

wonderful.

I mean, you just saw it with your own eyes.

It was just a live demonstration. I was pretty nervous about it.

I am very happy that it worked.

(Laughter.) But this is really unbelievable. After doing this, they found that the dogs were able to accurately tell us that someone had malaria 81 percent of the time.

It's unbelievable.

92% of the time, it can accurately tell if someone is not infected.

And these numbers actually exceed the diagnostic criteria set by the World Health Organization.

So we are seriously considering deploying dogs in countries, especially at ports of entry, to detect cases of malaria.

This may be reality.

But you can't put dogs everywhere. So what we are currently looking at and working on is the development of technology that allows individuals to self-diagnose, wearable technology.

Imagine a patch on your skin that changes color when it detects malaria in your sweat.

Or maybe it's a little more technical. A smartwatch that alerts you when you are infected with malaria.

And if this could be done digitally and data could be collected, imagine the amount of data that could be collected on a global scale.

This could completely transform the way we track the spread of disease, target control efforts and respond to disease outbreaks, and ultimately lead to the eradication of malaria, and beyond, other diseases we already know to have odors.

If we could harness the power of nature to find out what those smells were, we could do this.

Today, as scientists, we are on a mission to come up with new ideas, new concepts, new technologies to tackle some of the world's biggest problems, but what continues to amaze me is that in many cases nature has already done this for us, and the answer...

right in front of us.

thank you.

(applause)

Before I start: I'm really excited to be here to see what happens from here.

With that said, we start with: What is one of our greatest needs, one of our brain's greatest needs?

And I want to show you, not tell you.

I really want you to feel it.

There are so many things I want you to feel in these 14 minutes.

So if we could all rise up.

We are going to conduct a Strauss piece together.

are you OK? And you know it too.

are you OK. are you ready?

Audience: Yes!

Bo Lotto: Okay. Ready, 1, 2, 3!

It's over.

(Music: Richard Strauss "Thus Spoke Zarathustra") Right?

(music) Oh, here we come!

(music suddenly stops) Oh!

(laughs) Right?

Group intercourse was interrupted.

Yes, you can sit down.

(Laughter) We have to shut down fundamentally.

(Laughter) We love to close.

(Applause.) I've heard that Mozart said "Dada-da-da" to the piano just before he went to bed.

The father, who was already in bed, would have thought, "Oh."

He had to get up and hit the last note of the chord before he fell asleep again.

(Laughter) So the need for closure leads us to think. What is our greatest fear?

please think about it. What are we still most afraid of growing up?

And it's the fear of the dark.

We hate uncertainty.

We hate not knowing

we hate it

Think about horror movies.

Horror movies are always shot in the dark, in the woods, at night, in the depths of the sea, in the darkness of space.

The reason is that it was easy to die in the process of evolution.

If you weren't sure if it was a predator, it's too late.

Your brain evolved to predict.

And if you can't predict, you're dead.

And the way the brain predicts is by encoding the biases and assumptions that have served it well in the past.

But these thoughts don't stay in your head.

you project them into the world.

There are no birds there.

We are projecting that meaning onto the screen.

Everything I am telling you right now is literally meaningless.

(laughter) You create meaning and you project it onto me.

And what applies to objects also applies to other people.

You can measure the 'what' and 'when' they do, but you can't measure the 'why'.

So we color others.

We project meaning onto them based on our prejudices and experiences.

This is why the best designs are almost always about reducing uncertainty.

Therefore, when we step into a situation of uncertainty, our bodies react physiologically and mentally.

Your immune system begins to weaken.

Brain cells atrophy and even die.

Creativity and intelligence decline.

We often turn from fear to anger.

why? Because fear is a state of certainty.

You become morally judgmental.

You become an extreme version of yourself.

If you are conservative, be more conservative.

If you are liberal, you will be more liberal.

Because you are going to a familiar place.

The problem is that the world will change.

And we must adapt or die.

And if you want to go from A to B, B is not the first step.

The first step is to go from A to non-A. It means letting go of prejudices and prejudices. To step into the very places our brains have evolved to avoid. To step into an unknown place.

But our brain gave us the solution because getting to this place is so important.

Evolution gave us a solution.

And it is perhaps one of the deepest perceptual experiences.

And it's an awe-inspiring experience.

(music) (applause) (music) (applause) (music) (applause) (music) (applause) (Cheers) (applause) Beau Lot: Oh, isn't that great?

So right now you are probably feeling more or less in awe.

So what's going on in your brain right now?

And for thousands of years we've been thinking, writing, and experiencing awe, but we know so little about it.

So, in an effort to try to understand what it is and what it does, my Misfits Institute had the wonderful opportunity and joy of working with some of the greatest awe-inspiring creators we know: writers, creators, directors, accountants, people from Cirque du Soleil.

So we went to Las Vegas and recorded the brain activity of people watching over 10 performances of Cirque's iconic performance of 'O'.

We also measured pre-performance behavior and post-performance behavior in a separate group.

And over 200 people attended.

So what is awe?

What is going on in your brain right now?

It's a state of the brain. OK?

The prefrontal cortex, the front part of the brain responsible for executive function and attention control, is now downregulated.

The part of the brain called the DMN (Default Mode Network), which is the interaction between multiple regions in the brain and is active during ideation and creative thinking, such as divergent thinking and daydreaming, is currently upregulated.

And right now, the activity of the prefrontal cortex is changing.

Its activity is becoming asymmetric, skewed to the right, and highly correlated between people stepping into the world and stepping back.

In fact, the brain-wide activity of all these people was so correlated that it was possible to train an artificial neural network to predict whether people were in awe with an average accuracy of 75 percent and an accuracy of up to 83 percent.

So what does this brain state do?

For example, Professors Heidt and Keltner demonstrated by others that people feel connected to the world even though they are small.

And prosocial behavior increases due to increased familiarity with others.

And the study also showed that people have a lower need for cognitive control.

They feel more comfortable with uncertainty without coming to an end.

And your appetite for risk increases.

They really want risk and are better able to take it.

And what was really very profound was when we asked people, "Are you a person prone to awe?"

They were more likely to respond positively post-performance than pre-performance.

They literally redefined themselves and their history.

So awe is perhaps a perception greater than ours.

In the words of Joseph Campbell, “Awe drives us forward.”

Or, in the words of a dear friend, perhaps one of our greatest photographers still alive, Duane Michaels, just the other day he might give us the curiosity to overcome our cowardice.

So who cares? Why should you care?

Now consider the conflicts that seem ubiquitous in our society today.

If you and I are at odds, it's as if we're on opposite sides of the same line.

And my purpose is to prove you wrong and turn you over to me.

The thing is, you're doing the exact same thing.

You are trying to prove me wrong and lead me to you.

Remember that conflicts are for winning, not for learning.

Your brain only learns when we move.

Life is motion.

So what if we could use reverence not to get rid of conflict, but to eliminate conflict -- conflict is essential, conflict is how the brain expands, how the brain learns -- rather, what if we could enter into conflict in another way?

And what if awe allows you to enter into reverence in at least two different ways?

The first is to give us the humility and courage of not knowing.

right? Conflict with questions rather than answers.

What happens then?

Approach conflict with uncertainty rather than conviction.

And two, when confronted in that way, try to understand rather than persuade.

Because everyone means something to themselves, right?

And understanding another person means understanding the biases and assumptions that drive their actions.

And we have indeed initiated a pilot study to see if art-induced awe can be harnessed to promote tolerance.

And the results are actually incredibly good.

We can allay our anger and hatred by experiencing the awe that art creates.

So, given how important it is, where can we be in awe?

So if...

One suggestion is that awe is not only in grandeur.

Awe is essential.

Often it is a scale, a mountain or sunset landscape.

But what if you could actually rescale yourself and find the impossible in the simple?

If this is true, and our data is correct, then science, adventure, art, ideas, love, TED conferences, performances, and other endeavors are not only inspired by awe, but can actually be ladders into uncertainty that help us grow.

thank you very much.

(Applause.) Please come up.

(Applause) (Cheers) (Applause)

Scientists grapple with the boundaries of the unknown, where every new knowledge forms a path into a vacuum of uncertainty.

And nothing is more uncertain, or potentially enlightening, than a paradox.

Throughout history, paradoxes have threatened to undermine everything we know, but just as often they have reshaped our understanding of the world.

Today, one of the greatest paradoxes in the universe, the black hole information paradox, threatens to unravel the fields of general relativity and quantum mechanics.

To understand this contradiction, we must first define what we mean by "information".

The information we speak is usually visible to the naked eye.

For example, this kind of information indicates that apples are red, round and shiny.

But physicists are more interested in quantum information.

This refers to the quantum properties such as position, velocity and spin of all the particles that make up the apple.

All objects in the universe are made up of particles with unique quantum properties.

This idea is most prominently invoked in the important laws of physics that the total amount of quantum information in the universe must be conserved.

Even if you destroy an object beyond recognition, its quantum information will not be permanently deleted.

And in theory, knowing that information would allow us to recreate the object from the particle building blocks.

Information preservation is not just an arbitrary rule, but a mathematical necessity upon which much of modern science is built.

But around a black hole, that foundation shakes.

If an apple enters a black hole, it will appear as if it has left space, and all of its quantum information will be irretrievably lost.

However, this does not immediately violate the laws of physics.

Although the information is invisible, it may still exist within the mysterious space of the black hole.

Alternatively, some theories suggest that information never reaches the inside of the black hole.

From the outside, it looks as if the apple's quantum information is encoded on the surface of a black hole called the event horizon.

As the mass of the black hole increases, so does the surface of the event horizon.

Therefore, as a black hole engulfs an object, it may also grow large enough to store quantum information about that object.

But whether information is stored inside a black hole or on its surface, the laws of physics remain intact until we account for Hawking radiation.

Discovered by Dr. Stephen Hawking in 1974, this phenomenon shows that black holes are slowly evaporating.

Over incredibly long periods of time, black holes lose mass as they eject particles from their event horizon.

Importantly, the evaporating particles appear irrelevant to the information that the black hole encodes. This suggests that black holes and all the quantum information they contain could be completely erased.

Will that quantum information really disappear?

If not, where are they going?

The evaporation process takes an incredibly long time, but the questions it poses to physics are much more urgent.

The destruction of information forces us to rewrite some of the most basic scientific paradigms.

Fortunately, in science, every paradox is an opportunity for new discoveries.

Researchers are looking at a wide range of solutions to the information paradox.

Some have theorized that the information is actually encoded in the leaking radiation, but somehow we still don't understand it.

Some have suggested that this paradox is simply a misunderstanding of how general relativity and quantum field theory interact.

These two theories describe maximum and minimum physical phenomena respectively and are notoriously difficult to combine.

Some researchers argue that the solution to this and many other contradictions would naturally come from a "universal theory of everything." But perhaps the most striking theory to come from exploring this paradox is the holographic principle.

This principle, extending the idea that 2D surfaces in the event horizon can store quantum information, suggests that even the very boundaries of the observable universe are 2D surfaces that encode information about real 3D objects.

If this is true, reality as we know it could be just a holographic projection of that information.

If any of these theories are proven, it will raise new questions to be explored while maintaining the current model of the universe.

But it's also possible that those models are wrong.

In any case, this paradox has already helped us take another step into the unknown.

What I'm trying to do is briefly explain how to predict what Iran will do in the next few years, with some projections.

To predict effectively, we need to use science.

And the reason we need to use science is so that we can replicate what we do. It's not just wisdom or speculation.

And if we can predict, we can design the future.

So if you're concerned about influencing energy policy, or if you're concerned about influencing national security policy, health policy, or education, science, and certain areas of science, are a means to that end, not the way we've always done it: instant wisdom.

Before I tell you how, let me tell you a little truth about advertising. Because I'm not in the magic business.

There are a lot of predictable things in my approach, but there are also things that are unpredictable.

It can anticipate situations involving complex negotiations and coercion. It's essentially everything that has to do with politics and a lot of that has to do with business, sorry, I don't predict the stock market if it's for the purpose of speculating on the stock market. OK, the stock market isn't going up any time soon.

But I am not involved in such things.

I'm not involved in random number generator predictions.

In fact, I get calls from people who want to know their winning lottery numbers.

I have no clue.

I am working on using game theory. Game theory is a branch of mathematics, which means, sorry, even in the study of politics mathematics appears.

We can no longer pretend to be speculating about politics. We have to look at this in a rigorous way.

So what is game theory?

It assumes that people are looking for the good in themselves.

That we are selfish is controversial to many, but it doesn't seem all that surprising.

People have values ​​to determine what is best for them and what they consider to be the best for themselves. In other words, identify what you want and what you don't want.

And they have beliefs about what others want, what others don't want, how much power others have, how much others can get in the way of what they want.

And they may be weak, they may be in the wrong part of the world, they may be Einsteins somewhere in rural India farming unnoticed, facing limits and constraints. Such was the case for a long time with Ramanujan, a great mathematician who went unnoticed.

Well, who would be reasonable?

Many people worry about what rationality is.

What if people were rational?

Mother Teresa, she was reasonable.

Terrorists, they are rational.

Most people are reasonable.

I think there are only two exceptions that I know of. 2 year olds are not rational. He has very fickle tastes and constantly switches his thoughts. People with schizophrenia are probably not rational, but most other people are rational.

So they are just trying to do what they think is in their best interest.

Now, to figure out what people are going to do to pursue their own interests, we have to consider who has influence in the world.

If you are trying to influence a company to change its behavior with respect to pollutant generation, one approach, a common approach, is to encourage companies to improve and explain how they are harming the planet.

And many of you may find that it doesn't have as great an effect as you might hope.

But if you show that it's in their best interest, they'll do it.

Therefore, it is necessary to figure out who is influencing the problem.

I like to think that if we look at Iran, the president of the United States might have some influence, and yes, the president of Iran does have some influence, but it would be a mistake to focus only on the person at the top of the power ladder. Because he doesn't know much about Iran, or energy policy, or health care, or a particular policy.

The person surrounds himself with advisors.

If you're talking about a national security issue, it's probably the Secretary of State, the Secretary of Defense, the Director of National Intelligence, or even an Ambassador to the United Nations, or someone else who seems more knowledgeable about that particular issue.

But let's be honest, the Secretary of State doesn't know much about Iran.

The Secretary of Defense doesn't know much about Iran.

Those people, in turn, have advisors who advise them and can advise the president.

Many people shape decisions, so if you want to predict correctly, you need to pay attention to everyone trying to shape the outcome, not just those at the top of the decision pyramid.

Unfortunately, in many cases it is not done.

There are good reasons why we don't, and good reasons that game theory and computers can overcome the limitations of just observing a small number of people.

Imagine a problem with only 5 decision makers.

For example, imagine Sally here wants to know what Harry, Jane, George, and Frank are thinking and is sending them a message.

Sally passes her opinion on to them, and they pass theirs on to Sally.

But Sally also wants to know what Harry is saying to these three and what they are saying to Harry.

And Harry wants to know what those people are saying to each other and so on. And Sally wants Harry to know what those people are saying to each other.

It's a complicated issue. That's a lot to know.

With five decision makers, there are many relationships. If you remember the factorial, there are actually 120 ways.

5 factorial is 120.

Now, you might be surprised to learn that smart people can hold exactly 120 things in their heads.

Let's say you double the number of influencers from 5 to 10.

So the number of pieces of information we need to know has doubled from 120 to 240?

No, maybe 10 times?

Up to 1,200? no.

increased to 3.6 million.

No one can keep it clearly in their head.

But computers can. They don't need coffee breaks, they don't need vacations, they don't need to sleep at night, they don't ask for raises.

They can keep this information accurate, which means we can process it.

So I'm going to talk about how I handle that, and I'll give you some examples from Iran, and you're going to wonder, 'Why should I listen to this person?

Why should I believe him? ”

So let me give you the facts.

This is the Central Intelligence Agency's assessment of the percentage probability that the model I'm talking about is correct in predicting things for which the outcome is not yet known when the expert who provided the data input makes a mistake.

That's not my claim, it's the CIA's claim - as you can read, it was declassified some time ago. This content can be read at Yale University Press, edited by H. Bradford Westerfield.

So what do we need to know to predict?

You might be surprised how little you need to know.

We need to know who has a stake in trying to shape the outcome of our decisions.

We need to know what they want. You need to know what they say they want, not what they really want, not what they think they can get. Because it is a strategically chosen position from which we can work backwards to infer important characteristics of their decision making.

I need to know how focused they are on the problem at hand.

It's about how much we're willing to give up what we're doing when a problem comes up and work on it instead of something else we have. It's about how big a problem it is for them.

And how much impact could they have if they chose to address this issue?

Knowing these things, we can predict their behavior by assuming that everyone cares about two things in every decision.

they care about the results. They want results that are as close as possible to their interests.

They are careerists and care about getting credit. There is ego involved, and they want to be seen as important in shaping the outcome or, if it is their mastermind, in stopping the outcome.

So you need to understand how to balance these two.

Depending on the person, the trade-off is between standing for the outcome, sticking to it, sinking into the flames of glory, or giving up on the outcome and letting the wind run its course and doing whatever it thinks will lead to victory.

Most people fall somewhere in between, and if you can figure out where they fit in, you can find ways to negotiate with them to change their behavior.

So, with just a little bit of input, we can figure out what choices people have, what opportunities they are willing to accept, what they want, what they value, what they want, and what they believe about others.

We may find things we don't need to know. No history here.

How they got to where they are now may be important in shaping the input information, but knowing where they are makes me worry about where they might go in the future.

How they got there turned out to be of little importance in the prediction.

Remember the 90% accuracy rate.

So where does this information come from?

This information is available from many sources, including the internet, The Economist, The Financial Times, The New York Times, US News & World Report. You can also get it from asking experts who spend their lives researching places and problems. Because those experts know this information.

If you don't know who is trying to influence decisions, how much influence they have, how much they care about the issue, what they say they want, are they experts? That's what it means to be an expert, and it's the basic thing an expert should know.

Now let's turn to Iran.

Let me make three important predictions. Time will tell. Please look into this.

What is Iran going to do about its nuclear weapons program?

How secure is Iran's theocracy?

What does the future hold?

And everyone's best friend, Ahmadinejad. how is his situation?

What will happen to him in the next year or two?

Look at this, this is not based on statistics.

I would like to clarify here. We are not projecting past data into the future.

I took inputs such as positions and ran them through a computer model that simulated the dynamics of the interaction. These are the simulated dynamics, or predictions about policy trajectories.

If you look at the vertical axis here, you'll see that it doesn't go all the way to zero. There are plenty of other options, but I'm just giving a rough estimate here, so I'm narrowing the scale.

At the top of the axis is "Build the Bomb".

At 130, you start somewhere above 130 between building a bomb and building enough weapon-grade fuel to build a bomb.

According to my analysis, it was there that the Iranians were earlier this year.

The model then makes predictions for the future.

In 115 they only produce enough weapon-grade fuel to show they know how, but they don't build weapons, just research quantities.

It will achieve a certain amount of national pride, but it can't go to work building weapons.

And once they reach 100, they say they're going to build civilian nuclear energy, and that's their goal.

The yellow line shows the most likely path.

The yellow line contains an analysis of 87 Iranian decision makers and the vast number of outside influencers trying to pressure Iran to change its behavior, as well as various actors such as the United States, Egypt, Saudi Arabia, Russia, the European Union and Japan.

The white line reproduces the analysis if the international environment only forced Iran to make its own domestic decisions under domestic political pressure.

That will never happen, but if we are allowed to pursue our own ingenuity without international pressure, we will find that the front collapses more quickly.

But in any case, we should reach a stable equilibrium result by the end of this year or early next year.

And while that equilibrium is not what the United States wants, it is probably one that the United States can tolerate, and one that many other countries can tolerate as well.

And that means Iran can achieve nationalist pride by producing enough weapons-grade fuel through research to show that it knows how to make weapons-grade fuel, but not enough to actually build a bomb.

How is this happening?

Here we see that this is the distribution of forces in favor of civil nuclear energy today. Here's what the faction bloc is projected to look like in late 2010 to early 2011.

Currently, few support weapons-grade fuel research, but by 2011 it will be a large bloc, and when these two are combined, it will be the dominant influence in Iran.

Today there are many people here who not only want to build bombs, but also test them. Ahmadinejad for example.

Its power is completely gone. By 2011 no one will support it.

These guys are all shrinking and the power is all drifting here and the result will be weapons grade fuel.

Who is the winner and who is the loser in Iran?

Look at these guys, they continue to go from strength to strength, and by the way, this was done shortly before the current economic crisis, and it will probably get worse.

These people are Iran's money-making profiteers, bankers, oil people, bazaars.

With the exception of one group of mullahs, which are not well known to Americans, the mullahs are becoming more and more politically influential in their isolation.

That's this line here, gaining strength, what the Iranians call the tranquilists.

These are primarily Qom-based ayatollahs who have great influence in religious circles, but have remained silent on politics, but will increasingly speak out. Because they see Iran going in an unhealthy direction, the opposite of what Ayatollah Khomeini had in mind.

Mr Ahmadinejad.

There are two things to note. He's getting weaker, and while he's getting a lot of attention in the US, he's not a major player in Iran.

He is on his way down the mountain.

Now, I would like to step away from this topic for a moment.

Not everything is predictable. The stock market is unpredictable, at least for me, but most complex negotiations are.

Again, health policy, education, the environment, energy, litigation, mergers, etc. are all predictable and complex issues to which this kind of technology can be applied.

And the reason it's important to be able to predict those things is not just because you can run a hedge fund and profit from it, but because if you can predict what people will do, you can plan their actions.

And if you design what they do well, you can change the world and get better results.

I would like to leave you with one thought. That is the main theme of this meeting for me, and the main theme of this way of thinking about the world.

If you say, 'That's impossible,' say, 'If you say, 'I can't do that,' I'll be confused, 'I don't know how to do it.'

(Applause) Chris Anderson: I have one question.

It was so charming.

I am happy to bring it to the world.

But in the middle of the conversation, I got very nervous and panicked just to see if the model included the possibility of changing the outcome if I let this prediction out.

800 people are watching TEDTalks in Tehran.

Bruce Bueno de Mesquita: I've been thinking about it, and as I've done a lot of work for intelligence agencies, they've been thinking about it too.

Things would change for the better if people paid more attention, thought more seriously, and worked on similar calculations. But it will change the situation in two useful ways.

That would speed up how quickly people would come to an agreement, saving everyone a lot of grief and time.

And without much manipulation you will reach an agreement that everyone will be happy with. Basically that's what I do, I'm manipulating them.

that would be good.

CA: So you want to say, "O Iranian people, this is your destiny, let's go there."

BBM: Well, my dear Iranians, this is what many of you have evolved to hope, and we can get there faster, you will suffer much less from economic sanctions, you will be much less afraid of us using military force, and the world will be a better place.

CA: I hope they hear it that way. Thank you very much, Mr. Bruce.

BBM: Thank you.

(applause)

I'm from Detroit.

(Applause.) A world industrial giant in the 1950s with a population of 1.8 million and 140 square miles of land and infrastructure, it underpinned this burgeoning Midwestern urban core.

And today, just half a century later, Detroit is a prime example of urban decay.

Today, Detroit has less than 700,000 people, 84 percent of whom are African American, and decades of deprivation and capital flight from the city to the suburbs have created a labor shortage in Detroit.

A lack of retail, and more specifically fresh food retail, has resulted in a city in trouble, with 70 percent of Detroiters either obese or overweight.

They struggle to get the nutritious foods they need to stay healthy and prevent premature illness and diet-related illnesses.

Too many Detroiters live closer to fast food restaurants, convenience stores, and gas stations where they need to buy food than full-service supermarkets.

This is not good news for the City of Detroit, but this is the news and the story Detroiters are trying to change.

No, it takes back.

This is the story of how Detroiters are transformed through urban farming and food entrepreneurship.

The thing is, Detroit has a recent history and now has some very unique assets, vacant lots being one of them.

Experts say Boston, San Francisco and the boroughs of Manhattan could all fit on Detroit's square footage.

They also say 40 square miles of the city are vacant.

This equates to 1/4 to 1/3 of the city, and that much vacant land makes for a landscape unlike any other big city.

Detroit has a desperate need for open lands, fertile soils, proximity to water, a motivated workforce, and healthy, fresh food.

All of this has spawned a grassroots movement of people in Detroit to transform the city from what used to be the industrial capital of America into an agricultural paradise.

(Applause.) As you know, of all the cities in the world, I think Detroit, Michigan, is best positioned to be the global city's role model in food security and sustainable development.

Detroit today has more than 1,500, yes, more than 1,500 gardens and farms throughout the city.

And these aren't just lands for growing tomatoes and carrots either.

Because, as you know, urban farming in Detroit is all about community and we grow together.

So these spaces are jolly spaces.

These spaces not only provide friends, family and neighbors with healthy, fresh food, but are also places to build social cohesion.

Walk with me

Let me take you through some of Detroit's neighborhoods and show you what it's like to empower local leadership and support grassroots movements of people working for change in low-income neighborhoods and people of color.

Your first stop is Oakland Avenue Farms.

Oakland Avenue Farms is located in Detroit's North End neighborhood.

Oakland Avenue Farms is being transformed into a five-acre landscape that combines art, architecture, sustainable ecology and new market practices.

This is what agriculture really looks like in Detroit.

I had the opportunity to partner with Oakland Avenue Farms to host a Detroit farm-to-table dinner.

These are the dinners we bring people to the farm, giving them plenty of time and opportunity to meet them, greet them, talk to the producers, and then take them on a farm tour.

Afterwards, a farm-to-table meal is served, where chefs prepare the farm produce with the utmost freshness.

we do.

We want to change the relationship between people and food, so bring people to the farm and have them sit around the table.

We want you to know exactly where the farm-grown food on your plate came from.

Your second destination will take you to the Brightmoor district on the west side of Detroit.

Brightmoor is now a low-income community in Detroit.

Brightmoor has about 13,000 residents.

They decided to take a block-by-block strategy.

Nearby Brightmoor is a 21-block microdistrict called Brightmoor Farmway.

Now a notoriously unsafe and underserved community has been transformed into a cozy, beautiful and safe farm with lush parks and gardens, farms and greenhouses.

This close-knit community also recently rallied to purchase an abandoned building that had been dilapidated and foreclosed.

With the help of friends, family and volunteers, we were able to remove the bulletproof glass, clean up the grounds, and transform the building into a community kitchen, cafe and store.

Brightmoor farmers and food artisans now have a place where they can make and sell their products.

And people in the community have places to buy healthy, fresh food.

Urban farming, this is my third example, can be used as a way to enhance the business cooperative model.

What about the 1,500 farms and gardens we talked about earlier?

Keep Growing Detroit is a non-profit organization deeply involved with these farms.

They distributed 70,000 bags of seed and 250,000 transplants last year, resulting in 550,000 pounds of crops grown in Detroit last year.

(Applause.) But apart from that, they also manage and run cooperatives.

It's called "Grown in Detroit".

It consists of about 70 small farms.

They are all grown and sold together.

They grow fruits, vegetables, flowers and herbs to grow healthy foods in healthy soil free of chemicals, pesticides, fertilizers and GMOs.

And when their products are sold in local markets throughout Detroit, they get 100 percent of the sales.

In a city like Detroit, where far too many African Americans die from diet-related illnesses, restaurants have played a major role in increasing access to healthy, culturally appropriate restaurants in the city.

Join us for Detroit Vegan Soul.

Yes, there is a vegan soul food restaurant in the city of Detroit.

(Applause.) Yes, yes.

Detroit Vegan Soul offers Detroiters the opportunity to eat more plant-based meals and has received overwhelming response from Detroiters.

Detroiters are hungry for food that is culturally appropriate, fresh, and delicious.

That's why we founded FoodLab Detroit, a non-profit organization to help small, fast-growing food entrepreneurs in our neighborhood start and grow healthy food businesses.

FoodLab provides these entrepreneurs with incubation, hands-on education, workshops, technical assistance, and access to industry experts to help them grow and scale.

These are very small companies, but last year they totaled over $7.5 million in revenue and provided 252 jobs.

listen.

(Applause.) These are just a few examples of how we can expand opportunities for everyone to participate and thrive, especially those from regions that have historically been excluded from these kinds of opportunities.

I get it.

My city is far from successful.

We're still struggling, but I'm not going to stand on the stage and say that urban agriculture will solve all of Detroit's problems and challenges.

I don't mean to do that, but let me just say this. With urban agriculture, Detroit is starting to think differently about cities: cities that can be both urban and rural.

And yes, I know, these stories are small, these stories are neighborhood-based stories, but these stories are powerful.

They are powerful because they show how we are creating new societies in places and spaces that have crumbled from the old to become vacant.

These are powerful stories because they are stories about love, the love that the people of Detroit have for each other, the love we have for our community, the love we have for Mother Earth. But more importantly, these stories are about how the devastation, despair, and decline of the city of Detroit are never decided until the very end.

When hundreds of thousands of people left Detroit and assumed us dead, there was hope for those who remained.

They remained hopeful.

they never gave up.

They fought all the time.

And listen, I know that transforming a metropolis like Detroit into a thriving city, a functioning city, a healthy city, an inclusive city, a city that offers opportunity for all is tough, challenging, difficult.

But if we start strengthening the social fabric of our communities and launching economic opportunity in the most vulnerable areas, I believe it all starts with healthy, accessible, delicious and culturally appropriate food.

thank you very much.

(Applause.) Thank you.

After escaping Ethic, Hedge flies them to a remote settlement in the shadow of the Great Wall of China, which surrounds the country, Blood Barrier.

All the settlers there will soon meet for their monthly feeding.

The people of the ramparts spend their days collecting works of art and literature from all over the world.

On feeding days, the furnace robots come greedily.

When they eat, the lights stay on and the food is delivered.

When they starve, people starve too.

When Hedge and Ethic arrive on the outskirts of town, they run out of fuel and crash land.

Luckily, everyone is too busy preparing food to notice.

Feeding today is where ethics find leaders in the underground resistance movement.

This person knows the location of the first of three powerful artifacts.

The problem is that Hedge and Ethic don't know the Resistance leader's name or what he looks like.

However, Hedge collected the following information: The leader has green eyes.

If the leader has red hair, his name will contain at least one consecutive two letter.

If the leader wears glasses, his name contains exactly two vowels.

Otherwise, the name contains exactly three vowels.

There is exactly one person for whom all of this applies.

A fugitive, Ethic cannot sneak into a crowd without attracting attention.

However, she can give Hedge instructions.

One of her tools is what programmers call conditionals.

This is a statement of the form "if A then B". Flowcharts are great illustrations of how they work.

This condition means that if A is true, execute instruction B.

There are also conditional statements that allow for different possibilities.

This means "if A is true, execute instruction B."

Otherwise, follow instruction C. So what instructions will she give so that Hedge can find the leader of the Resistance?

Stop now and figure it out for yourself.

In a problem like this, it helps to simplify first.

What if Hedge only had to look at this one person?

What information should he collect about her?

He might ask, "Does she have green eyes?" What other questions should hedges ask to find resistance leaders, and how can the answers be tracked?

Stop now and figure it out for yourself.

It may be intuitive how we, as humans, approach this problem.

But since Hedge is not human, the challenge is that you need to give him systematic instructions that work in any scenario.

Hedge must examine the colonists one at a time until he finds the right one.

So it's a loop that repeats the same instructions, just like a cell key.

Only this time, the loop contains a series of questions in the form of conditional statements and exits as soon as the hedge finds its target.

But first you need to organize your information.

Each person has their own characteristics, such as eye color, hair color, glasses, and name.

Are this person's eyes green?

If so, put a check next to "Eye Color". If not, put an X there.

If you're redhead, does your name have two letters?

In that case, please check "Hair color". If there is no double letter, put an X mark next to "Hair Color". A person with red hair and no double letters cannot be a resistance leader.

Note, however, that if your hair is blue, Hedge will skip this question and move on to the next.

As for your last question, you can say: "If you wear glasses, does your name have exactly two vowels?"

If you don't wear glasses, does that name have exactly three vowels?" There are people in the crowd who wear glasses and have one vowel, or who don't have glasses and have two vowels.

But they're not who we're looking for, so they get an X.

The resistance leader must be the person with either a check mark or a blank next to every question.

If someone has blue hair, the rules about red hair don't apply to them, so blanks are fine.

You can have Hedge ask every question about every person and select the person with just a check and a blank.

However, there is a way to save a lot of time. As soon as the hedge gets an X, let the next person move on.

You don't have to know the answer to every question. A single X means it is not searched.

Hedge rustles through the crowd and within minutes finds the resistance leader, Adira, and takes her back to Ethic.

Adira agrees to help steal the first artifact, the Node of Power, on the condition that Ethic and Hedge reprogram the furnace bots that are terrorizing the town and revitalize the revolution.

And the robot descends at the same time as the signal.

Chak Ek ascended from the underworld to the surface of the eastern sea and then to heaven.

His younger brother Kin Ahau followed suit.

Chak Ek was the first to rise, but Kin Ahau outnumbered him, and an outraged Chak Ek returned to the underworld to plot against his brother.

In Mayan mythology, Chaquek represents Venus and Cainahau represents the Sun.

Also known as the morning star, the evening star, Venus moves through the sky and can be seen before sunrise, after sunset, or not at all.

The ancient Mayans identified this roughly 584-day cycle more than 1,000 years ago and still accurately predict when and where Venus will appear in skies around the world.

Five of these cycles made up almost exactly eight years, and the Maya also recognized this larger cycle.

They assigned five different forms to Chak Ek, one for each Venusian cycle, repeating every eight years.

Within a 584-day cycle, Venus is visible in the evening sky for 250 days, then disappears for 8 days before reappearing as the morning star.

The ancient Mayans gave special importance to this point in the cycle, the first appearance after Venus disappeared and before sunrise.

On this day, Chak Ek was resurrected from the underworld with a spear-thrower and an arrow in hand.

He decided to attack his brother and his brother's allies in order to bring discord to the world.

His first target was Kawir, the god of nourishment and thunder.

Awakening at the end of the rainy season, Chak Ek aimed his spear at Kawil, damaging food supplies and disrupting social order until Kawil was resurrected.

584 days after attacking Kawil, Chak Ek turned his attention back to his brother, the Sun.

The sun took the form of a jaguar every night and traveled through the underworld.

Chak Ek speared the jaguar sun rising at dawn towards the end of the dry season.

The sun was damaged and the world plunged into an age of turmoil and war.

Chak Ek's third victim was the maize god who provided food for all mankind.

Chak Ek speared him at harvest time.

He was buried in the Underworld, and corn, the staple food of life, was no longer available to Earth's inhabitants.

However, the Maize God appeared three months later at a place of new beginnings, a cave in the east known as the Seven Water Places, and brought food to the earth again.

Chak Ek suffered a fourth victim when the turtle Akh Nak ascended into the sky to celebrate the summer solstice.

With this auspicious death, the sun, food, and people were buried underground, and the forces of chaos reigned.

But out of the chaos, a new order was established by Hun Ajaw, one of the heroic twins everyone remembers for defeating the Lord of the Underworld.

A new human race made from corn was created.

However, this balance did not last long.

Chak Ek's fifth and final victim was a mysterious stranger from the west whose death in the midst of the dry season shook the order established by Hun Ajaw.

Gods, lords and maize were buried in the underworld.

However, Chak Ek's victory will also be temporary.

The two brothers, Venus and the Sun, were caught in an endless cycle as they recreated the same five struggles, fighting for supremacy while the world oscillated between order and chaos with the appearance of the morning star.

In April of 2007, New Jersey Governor John Corzine was involved in this horrific car accident.

He was in the right passenger seat of this SUV that crashed on the Garden State Parkway.

He suffered multiple fractures and multiple lacerations and was taken to a trauma center in New Jersey.

He needs immediate surgery, seven units of blood, a ventilator to help him breathe, and a few more surgeries on the way.

It's amazing that he survived.

But perhaps even more surprising is that he wasn't wearing a seatbelt.

And in fact, he never wore a seatbelt, and the New Jersey state troopers who once drove him around pleaded with him to put it on, but he didn't.

Now, before Mr. Corzine became governor of New Jersey, he was a senator from New Jersey, and before that he was the CEO of Goldman Sachs, where he was responsible for going public and making hundreds of millions of dollars.

Now, no matter what you think of John Corzine politically, no matter how he made his money, no one would say he was stupid.

But at a time when every American knows seat belts save lives, he was an unrestrained passenger in a car accident.

This one story reflects a fundamental weakness in our approach to improving health behaviors.

Almost everything we tell our doctors, and what we tell our patients, is based on the idea that we act rationally.

You give me information, I process that information in my head, and my behavior changes as a result.

Do you think John Corzin didn't know that seat belts save lives?

Do you think he just didn't get the note?

(Laughter) John Corzine didn't have a knowledge flaw, he had a behavioral flaw.

It's not that he didn't know much.

It just means he couldn't have done better.

Rather, I think the mind is a highly resistant channel.

It's hard enough to change a person's mind with information.

It is even more difficult for information to change their behavior.

The only way we can significantly improve medical and health care is by significantly improving medical and health care behaviour.

Hitting my patellar tendon with a reflex hammer causes my foot to jerk forward, jerking forward much faster and more predictably than I think I can.

It's a reflex.

We need to look for equivalent behavioral reflexes and link the healthcare wagon to them.

However, it turns out that most conventional approaches to human motivation are based on the idea of ​​education.

We believe that people don't act as they should because they don't know more.

"If people knew smoking was dangerous, they wouldn't smoke."

Or think about the economy.

The premise there is that we are all constantly calculating the costs and benefits of every action we take and optimizing it to make perfectly correct and rational decisions.

If that's true, then all we have to do is find the perfect payment system for doctors, or the perfect copays and deductibles for patients, and all will be well.

A better approach is in behavioral economics.

Behavioral economists recognize that humans are irrational.

Our decisions are emotionally based or sensitive to frameworks and social context.

We don't always do what is in our own long-term best interest.

But the main contribution to behavioral economics is not to recognize that humans are irrational. It's about recognizing that we are irrational in a very predictable way.

In fact, being able to anticipate our psychological weaknesses allows us to develop strategies to overcome them.

Advance warnings are prepared in advance.

In fact, behavioral economists often take advantage of the very same behavioral reflexes that get us into trouble and redirect them to help us rather than hurt them.

We see irrationality playing out in what is called the 'present bias'. So immediate results are far more motivating than important distant future outcomes.

If I was on a diet, and I'm always on a diet (laughs), I know I shouldn't eat chocolate cake if someone offers me a delicious-looking chocolate cake.

That chocolate cake would land on that part of my body—permanently—where that kind of food would naturally settle.

But the chocolate cake looks so delicious and I have it in front of me, so I can wait until tomorrow to go on a diet.

I loved comedian Stephen Wright.

He will tell zen-like jokes.

My favorite is this one. "Hard work pays off in the future, but laziness pays off now."

(Laughter.) And there's a current bias in patients, too.

If you have high blood pressure, you absolutely want to avoid a stroke and know that taking antihypertensive drugs is one of the best ways to reduce your risk, but avoiding a stroke is far in the future and the time to take your medicine is now.

Nearly half of people prescribed high blood pressure drugs stop taking them within a year.

Think about how many lives you could save if you could solve just one problem.

We also tend to overestimate the value of small probabilities.

This actually explains why the state lottery is so popular, even though you can get a penny for every $1.

Now, some of you may buy lottery tickets. It's fun, and there's also the chance of getting rich quick...

But let's be honest, this is a horrible way to invest your retirement savings.

I once saw a bumper sticker that read, "State lottery special tax for those who can't count." This is not a hoax.

(Laughter) It's not that I can't do math, it's that I can't feel math.

And we pay too much attention to regret it.

We all hate the feeling of missing out.

So, in fact, there was a recent lottery, a mega-jackpot lottery with huge profits of over $1 billion.

And while everyone in my office is pooling their money to buy lottery tickets, I don't have one.

That's why I boast in the office that the lottery is a special tax for those who can't count.

(Laughter) And then I thought,

What if they win?

(Laughter) I'm the only one coming to work the next day.

(Laughter) It's not that I didn't want my colleague to win.

I just didn't want them to win without me.

Now, it would have been easier if I had put the $20 bill straight into the office shredder, and the result would have been the same.

I handed him a $20 bill, even though I knew I shouldn't have attended, but I never looked at it again.

(Laughter) We've done a lot of experiments where we gave patients these electronic vials and they could tell if they were taking their medication.

And we give them lottery tickets.

they receive prizes.

However, you can only win the prize if you have taken your medication the previous day.

If not, you'll see a message like, "You could have won $100, but you didn't take your medicine yesterday, so I don't know."

Well, after all, patients hate it.

They hate the feeling of missing out and are much more likely to take medication because they can anticipate that feeling of regret and want to avoid it.

It's effective to capitalize on the feeling of loathing regret.

And that brings us to a more general point. In other words, recognizing how irrational people are makes it much more advantageous to help them.

Well, this kind of unreasonableness is also true in the men's restroom.

So let's break this down for those of you who don't go to the urinal often.

(Laughter) There's pee all over the floor.

(Laughter) And I found that etching an image of a fly on the back of the urinal could solve this problem.

(Laughter) (Applause) And it makes perfect sense.

(Laughter) When I find a fly, I catch it.

(Laughter) The fly will fall.

(Laughter) Now, this naturally raises the question why were they peeing on the floor in the first place if men could aim.

In fact, if you're going to pee on the floor, why pee in front of the urinal?

You can pee anywhere.

(Laughter) And the same goes for healthcare.

At our hospital, there was a problem that doctors were prescribing brand-name drugs even though generic drugs were available.

Each line on this graph represents a different drug.

And they are listed according to how often they are prescribed as generic drugs.

They have a 100% chance of being prescribed as generic drugs.

At the bottom, less than 20% are prescribed generically.

And I had meetings with clinicians and all sorts of educational sessions and nothing worked. All lines were nearly horizontal.

In the past, someone would install a small piece of software in the electronic medical record that would default prescriptions to generics instead of branded drugs.

Now, you don't need to turn to statisticians to see that this problem was solved overnight and has been solved ever since.

In fact, in the two and a half years since the program started, our hospital has saved $32 million.

Again, $32 million.

And all we did was make it easier for doctors to basically do what they've always wanted to do.

It can also influence people's perceptions of loss.

We did this in a contest aimed at getting people to walk more.

We wanted everyone to walk at least 7,000 steps, so we measured the number of steps with the phone's accelerometer.

The control group, Group A, had just been told whether they had walked 7,000 steps.

Group B received a financial incentive.

We gave them $1.40 for every 7,000 steps they took.

Group C also received the same financial incentive, but it was structured as a loss rather than a gain. $1.40 a day equals $42 a month. So we gave participants $42 at the beginning of each month in a virtual account they could see, and took away $1.40 for each day they didn't walk 7,000 steps.

Now, economists would say that these two financial incentives are the same.

Get richer by $1.40 for every 7,000 steps you take each day.

But behavioral economists would say they are different because we are much more motivated to avoid a loss of $1.40 than to achieve a gain of $1.40.

And that's exactly what happened.

The group that received $1.40 for every 7,000 steps walked was less likely to reach their goal than the control group.

Financial incentives didn't work.

However, those who had the loss quota incentive achieved their goals more than 50 percent of the time.

Economically it doesn't make sense, but psychologically it makes sense because the losses outweigh the gains.

And now, we're using loss quota incentives to help patients walk more, lose weight, and take their medications.

Money can be a motivator.

we all know that.

But when combined with psychology, its impact is even greater.

And of course money has its downsides.

My favorite example is the day care program.

The biggest sin a nursery school commits is picking up a child late.

no one is happy.

Your children are crying because you don't love them.

(laughs) I'm not happy with the teachers because they leave work late.

And you feel terribly guilty.

This day care program in Israel wanted to stop this problem and did what many day care programs in the US did. That is, if you are late for pick-up, you will be fined.

And the fine they chose was 10 shekels, or about $3.

And what do you think happened?

More late pickups.

And when you think about it, it makes perfect sense.

Oh my God!

For 10 shekels -- (laughter) you can look after my kids all night!

(Laughter) They took advantage of the perfectly strong intrinsic motivation not to be late and cheapened it.

Worse, even though they realized their mistake and stripped them of their financial incentives, late pick-ups remained at a high standard.

They had already poisoned the social contract.

Medicine is full of powerful intrinsic motivations.

There are already doctors and patients who want to do the right thing.

Financial incentives can help, but you shouldn't expect money to do all the heavy lifting in the medical field.

Rather, it is probably our social interactions that have the most powerful influence on health behavior.

Social engagement works in medicine, and it works in two directions.

First, we basically care what other people think of us.

So one of the most powerful ways to change our behavior is to allow others to witness our activity.

We behave differently when we are being observed than when we are not.

I've been to restaurants that don't have a sink in the toilet.

Instead, when you step outside, the sink is outside the main part of the restaurant and everyone can see if you are washing your hands there.

I don't know for sure, but I do believe that handwashing is much more important in these particular environments.

We always do our best when we are being observed.

In fact, there was an amazing study done in the intensive care unit of a hospital in Florida.

Handwashing rates were very low, which is of course dangerous as it can spread infection.

So some researchers glued a picture of someone's eyes onto the sink.

It was just a picture, not a real person.

In fact, it wasn't even their whole face, only their eyes were looking at you.

(Laughter) The hand-washing rate has more than doubled.

We seem to care so much about what others think of us that even just imagining ourselves being observed improves our behavior.

And we don't just care what others think of us, we basically model our own behavior by looking at other people's behavior.

And all back to seat belts.

As a kid, I loved the "Batman" TV series starring Adam West.

Everything Batman and Robin do is so cool, and of course the Batmobile was the coolest of all.

Well, the show ran from 1966 to 1968, when seat belts were an optional accessory in cars.

But the producers of that show did something very important.

As Batman and Robin enter the Batmobile, the camera focuses on their knees and Batman and Robin are seen donning their seatbelts.

Now, if Batman and Robin wear seatbelts, I must have intended to wear one too.

I think that show saved thousands of lives.

And, again, it works in healthcare.

Doctors see how other doctors use antibiotics and use them more appropriately.

So much activity in the medical field is covered up and unwitnessed, but doctors are social animals and perform better when they see other doctors doing it.

So social influence also works in medicine.

So does connecting it with the concepts of regret and loss aversion.

If everyone thought they were always rational, we would never consider using these tools.

Now, let me be clear: I am not criticizing rationality.

I mean, that would be really absurd.

But we all know that it's the irrational part of the mind that gives rise to passion, courage, creativity, inspiration, and everything else.

And we know other things too.

We know that addressing the irrational aspects of human nature, rather than ignoring or resisting them, is far more effective in improving health behavior.

Understanding our irrationality is just one tool in our toolbox when it comes to healthcare.

And exploiting that irrationality may be the most rational course of action.

thank you.

(applause)

First, let me tell you about an email I recently received in my inbox.

Well, I have a rather unusual inbox. Because I'm a therapist and I write an advice column called "Dear Therapists." You can imagine what is in there.

I mean, I've read thousands of very personal letters from strangers all over the world.

And the contents of the letters range from broken hearts and feelings of loss to conflicts with parents and siblings.

I saved them in a folder on my laptop and named it "Life Issues".

So I get this email and I get a lot of emails like this. And I would like to take you into my world for a moment and read one of these letters.

And here's how it looks.

“Dear therapist, I have been married for ten years and things were going well until a few years ago.

From then on my husband didn't want to have sex so much and now he almost never has sex. ”

I'm sure you didn't expect this either.

(Laughter) "Last night, I found out that he's been secretly making long, late-night phone calls to women in his office for the past few months.

I googled her and she was gorgeous.

I can't believe this is happening.

When I was young, my father had an affair with a colleague, which caused our family to fall apart.

Needless to say, I was devastated.

If you continue your married life like this, you will no longer trust your husband.

But I don't want my kids to end up in situations like divorce or stepmother.

what should i do? "

Now what do you think she should do?

If you have received this letter, you may be thinking about how painful an affair can be.

Or maybe it's about how especially painful it is here because of her experiences growing up with her father.

And, like me, you probably have some sympathy for this woman, and what can I say, I'll call it a "not very positive" feeling towards her husband.

Now, when I read these letters in my inbox, something like that pops into my head too.

But I must be very careful when I reply to these letters. Because I know that every letter I receive is really just a story written by a specific author.

And that another version of this story also exists.

It always is.

And I know this because if I have learned anything as a therapist, it is that we are all unreliable narrators of our own lives.

I.

you.

And so does everyone you know.

This probably shouldn't have been told to you. Because now you won't believe my TED talks.

It doesn't mean it's intentionally misleading.

Most of what people tell me is absolutely true from their current perspective.

They tell stories in a certain way, depending on what they emphasize, what they downplay, what they leave out, what they omit, what they see and want me to see.

Psychologist Jerome Bruner articulated this beautifully when he said, "To tell a story is to take an unavoidable moral position."

We all carry stories about our lives.

Why choices were made, why things didn't work out, why did we treat someone a certain way, obviously because they deserved it - why did someone treat us a certain way - why did someone treat us a certain way when clearly we didn't.

Stories are how we make sense of our lives.

But what if the story we tell is misleading, incomplete, or simply wrong?

Now, instead of providing clarity, these stories leave us bogged down.

We assume that our circumstances shape the story.

However, I have found many times in my work that the exact opposite happens.

How we talk about our life determines what that life will be like.

That is the danger of our story. Because they can really confuse us. But it is also their power.

Because what it means is that if we can change our story, we can change our lives.

And today I would like to show you how.

Now, when I said I was a therapist, I am actually a therapist. I am not an unreliable narrator.

But if someone asks me what I do, say, on a plane, I usually say I'm an editor.

I say that also because whenever I say I'm a therapist, the awkward response is always, "Oh, you're a therapist."

Are you going to psychoanalyze me? ”

And I'm thinking, "A: No, B: why are we doing that here?"

If I said I was a gynecologist, could you ask me if I was going to do a vaginal examination? ”

(Laughter) But the main reason I say I'm an editor is because it's true.

Now, it's the job of all therapists to help people edit, but what's interesting about my particular role as a dear therapist is that when I edit, I'm not editing for just one person.

I use one letter each week as an example to teach an entire group of readers how to edit.

So I'm thinking, "What is the extra material?"

“Is the hero moving forward or in circles, are the supporting characters important or are they a hindrance?”

Can you see the theme from the plot points?

And what I've noticed is that most people's stories tend to revolve around two key themes.

The first is freedom, the second is change.

And when editing, start with these themes.

So let's take a look at freedom.

Our story about freedom goes something like this. We generally believe that we have a great deal of freedom.

The matter at hand is another matter, in which case we suddenly feel like we have nothing.

A lot of our stories are about feeling trapped, right?

We feel trapped by family, work, relationships, and the past.

Sometimes we even lock the whipping story to ourselves. I am sure you all know these stories.

Story "Everyone's Life Is Better Than Mine" (Courtesy of Social Media).

The story "I'm a cheater", the story "I'm not loved", the story "Nothing works for me".

"When you say 'Hey Siri' and she doesn't answer, it means she hates me."

The woman who wrote me that letter also feels trapped.

If she stayed with her husband, she would never trust him again, but if she left her children would suffer.

Now, there's a cartoon that I think is a perfect example of what's really going on in these stories.

The cartoon shows prisoners swinging the bars and desperately trying to get out.

But left and right are empty.

No bar.

Prisoners are not in prison.

that's most of us.

We feel completely trapped and trapped in an emotional prison.

But we know there are pitfalls, so we don't walk around bars looking for freedom.

Freedom comes with responsibility.

And if we are responsible for our role in the story, we may just have to change.

And that's another common theme we see in our stories. It is "change".

These stories sound like: Some say, "I want to change."

But what they really want to say is, "I want another character in the story to change."

The therapist describes this dilemma as ``if the queen had the ball, she would be the king''.

So -- (Laughter) It doesn't make sense, does it?

Why wouldn't you want him to change into the main character of the story?

It may be because change, even really positive change, comes with a surprising amount of loss.

Loss of familiarity.

At least we know the characters, the setting, and the plot, down to the recurring dialogue in this story, even if what we're used to looks jarring or downright heartbreaking.

"I never do laundry!"

"I've done it before!"

There's a strange comfort in knowing exactly how the story will go each time.

Writing a new chapter means venturing into the unknown.

It's staring at a blank page.

And, as any writer will tell you, nothing is more terrifying than a blank page.

But here comes the problem.

Editing the story makes writing the next chapter much easier.

In our culture, we talk a lot about knowing ourselves.

But part of knowing yourself is knowing yourself.

Letting go of the version of the story you've been telling yourself to live your life, not the story you've been telling yourself about your life.

Then we walk around the bar.

So I would like to return to the letter from the woman about the extramarital affair.

she asked me what to do

Now I have this word taped to my office: Ultra Crepidarianism.

The habit of giving advice or opinions beyond one's knowledge or ability.

Great words.

Can be used in all different situations. I'm sure you'll be using it after this TED Talk.

I use this word because it reminds me that as a therapist I can help people sort out what they want to do, but I can't make life choices for them.

Only you can write the story. All you need is a few tools.

So what I want to do is I want to edit this woman's letter here together as a way to show how we can all revise our stories.

First, I would like you to consider the story you are telling yourself right now, which may not be very helpful.

It could be about a situation you're going through, a person in your life, or even about yourself.

And I want you to pay attention to supporting characters.

Who are the people who are helping to support the misinterpretation of this story?

For example, if the woman who wrote me that letter told her friends what happened, they would probably have what they call "stupid sympathy" for her.

Now, with silly sympathy, we go along with it, and when a friend tells us he didn't get the promotion he wanted, we say, "Yes, that's very unfair." Even though I know it's happened several times before because he didn't really put in the effort and probably stole office supplies as well.

(Laughter) When a friend says he broke up with his boyfriend, we say, "Yeah, that's right, he sucks." Even though I know she tends to do things that tend to happen in relationships, like constantly texting and rummaging through his drawer, which tend to have consequences.

we are aware of the problem. For example, if a fight breaks out at every bar you go to, it could be you.

(Laughter) To be a good editor, you have to show wise compassion not only to your friends, but to yourself.

This is what is technically called "delivering compassionate truth bombs."

And these truth bombs are compassionate because they help us understand what we've been missing from the story.

The truth is, we don't know if this woman's husband is cheating on her, why her sex life changed two years ago, or what the late-night phone call was all about.

And maybe because of her background, she's writing a peculiar story of betrayal, but maybe there's something in her letters, or maybe even herself, that she doesn't want me to see.

It's like that person taking the Rorschach test.

Do you know the rorschach test?

A psychologist shows you some ink blots that look like it and asks, "What do you see?"

So the man looked at his own ink stain and said, "I'm sure you don't see any blood."

And the examiner says, "Okay, tell me what else you absolutely can't see."

In writing, this is called a point of view.

What is it that the narrator does not want to see?

So I would like to read your letter again.

And it looks like this:

"Dear therapist, I need my wife's support.

Everything I do annoys her these days. Even small things like the sound you make when you chew.

At breakfast she finds herself sneaking extra milk to keep the granola from getting too crispy. ”

(Laughs) "I feel like she's become more critical of me since my father died two years ago.

I got along very well with him, but her father left home when she was very young, so she couldn't empathize with what I was going through.

I have a friend at work who lost his father a few months ago and understands my grief.

I wish I could talk to my wife like I would talk to a friend, but now I feel like she can barely forgive me.

How can I get my wife back? ”

OK。

So what you've probably noticed is that this is the same story I read earlier, just told from a different narrator's point of view.

Her story was about a cheating husband, and his story was about a wife who couldn't understand her husband's grief.

But what's remarkable is that despite their differences, both of these stories are about a longing for a relationship.

And if you can get out of the first-person narration and write the story from another character's point of view, suddenly that other character becomes more sympathetic and the plot expands.

This is the most difficult step in the editing process, but it's also where change begins.

What if I wrote my story from another person's point of view?

What do you see now from this wide field of view?

That's why, when I see someone depressed, I sometimes say, "You're not the best person to talk to about yourself right now." Because depression distorts our story in a very specific way.

It narrows our horizons.

The same is true when you feel lonely, hurt, or rejected.

We create all sorts of stories that are distorted through a very narrow lens that we don't even know we're looking at.

And we have effectively become our own fake news broadcasters.

I have a confession to make.

I wrote my husband's version of the letter I read to you.

By the way, you don't know how much time I spent on granola or pita chips.

I wrote this based on all the alternative stories I've seen over the years, not only in therapy practice but also in columns.

When two people in the same situation wrote me without each other's knowledge, leaving two versions of the same story in my inbox.

that really happened.

I don't know what the other versions of this lady's letter are, but this is what I know. she has to write it

Because with courage in editing, she could make the letter to me more nuanced.

Even if her husband has been, and maybe is, cheating on her in some way, she doesn't need to know what the plot is yet.

Because the more you edit, the more possibilities you have for what your plot will look like.

Now, sometimes you see people who are really stuck, and they take their deadlock seriously.

We call them refusal-to-help claimers.

I'm sure you know someone like this too.

They are the people who, when you try to make a suggestion, reject it by saying, "Yeah, no, that won't work, because...".

"Yes, no, that's impossible, I can't."

"Yeah, I really want more friends, but they're really annoying me."

(Laughter) What they really reject is a compilation of stories of their misery and impasse.

So with these people, I usually take a different approach.

And what I'm doing is saying something else.

I tell them, "We are all going to die."

I'm sure you're glad I'm not your therapist now.

Because they're looking at me the same way you're looking back at me now with a completely confused look on your face.

But I explained that ultimately there is a story to be written about all of us.

It's called an obituary.

And it says we can shape these stories while we are alive, rather than be the authors of our own misfortunes.

We can be the protagonists rather than the victims in our stories, living in our hearts and choosing what is written on the pages that shape our reality.

I tell them life is about deciding which stories to listen to and which stories need to be edited.

And because nothing is more important to our quality of life than the stories we tell ourselves, we believe the effort to make revisions is worth it.

I would say that when it comes to your life story, you should aim for your own Pulitzer Prize.

Now, most of us aren't complainers who refuse help, or at least we don't believe they are.

But that's a role we can easily fall into when we're feeling anxious, angry, or vulnerable.

So the next time you're struggling with something, remember that we're all going to die one day.

(Laughter) Then pull out your editing tools and ask yourself: What do you want your story to look like?

And write a masterpiece.

thank you.

(applause)

Bacteria are the oldest organisms on earth.

They have been here for billions of years and are single-celled microbes.

So they are one cell and have the special property of having only one piece of DNA.

Therefore, they have very little genes and genetic information to encode all the traits they carry out.

And the way bacteria live is that they take nutrients from the environment, grow to double in size, and cut themselves along the way, making one cell two.

They only grow and divide and grow and divide. I mean, it's kind of a boring life, but what I want to argue is that we're having great interactions with these creatures.

I know you think of yourself as human, and this is what I think of you as well.

This man is thought to represent a common human being, and all the circles within him are all the cells that make up his body.

Humans have about 1 trillion cells that allow each of us to be ourselves and do everything.

But at any moment of your life there are 10 trillion bacterial cells in or on your body.

This means that humans have 10 times more bacterial cells than human cells.

And, of course, it's the DNA that counts. Here are all the A's, T's, G's and C's that make up your genetic code and give you all the attractive traits.

There are approximately 30,000 genes.

Well, it turns out that you have 100 times more bacterial genes that play a role in you and throughout your life.

So, at best, you are 10% human. About 1% are probably human, depending on which of these metrics you prefer.

I know you think you're human, but I think you're 90 or 99 percent germ.

(Laughter) And these bacteria are not passive lidars.

These are very important. they keep us alive.

They cover us with an invisible armor that protects us from attacks from the environment and keeps us healthy.

They digest our food, make vitamins, and actually educate our immune system to ward off bad microbes.

I mean, they help us, they do all the amazing things that are essential to our survival, and they never get the press.

But they also do a lot of terrible things, which is why they get a lot of press.

I mean, there are all sorts of bacteria on earth that have nothing to do with being in or on your body at any given time, and if they're there, they'll make you incredibly sick.

So the question for my lab is, do we want to think about all the good things bacteria do, or do we want to think about all the bad things they do?

The question we had was, how on earth could they do anything?

In other words, it's incredibly small.

You need a microscope to see it.

They lead tedious lives, growing and dividing, and have always been considered asocial and reclusive creatures.

So it seemed to us that their mere actions as individuals were too small to have an impact on the environment.

So we wanted to see if bacteria could live in another way.

And the clue to this came from another marine bacterium, a bacterium called "Vibrio fischeri."

What you see on this slide is a person in my lab holding a flask of bacterial culture. This bacterium is a harmless and beautiful bacterium from the sea named Vibrio fischeri.

And this bacterium has the special property of emitting light, producing bioluminescence in the same way that fireflies emit light.

I haven't done anything to the cells here. I just turned off the lights in the room and took a picture. This is what we are seeing.

And what was really interesting to us wasn't that the bacteria gave the light, but when the bacteria gave the light.

What we have noticed is that when the bacteria are alone, they do not emit light when in a diluted suspension.

However, when a certain number of cells is reached, all bacteria emit light at the same time.

So the question we have is, how can these primitive organisms, bacteria, distinguish between being solitary and acting in groups, and then all do something together?

And what we've figured out is the way they do it is they're talking to each other, talking in chemical language.

So this is thought to be my bacterial cell.

It doesn't glow when it's alone.

But what it does is produce and secrete small molecules that can be thought of as hormones, and these are the red triangles.

And when the bacteria are alone, there is no light because the molecules just float.

But when the bacteria grow and multiply, and they all participate in making these molecules, the molecule, and thus the extracellular amount of that molecule, increases in proportion to the number of cells.

And when the molecule reaches a certain amount, it tells the bacteria how many bacteria are next to it, the bacteria recognize the molecule, and all the bacteria turn on the light in sync.

That's how bioluminescence works - they speak in chemical terms.

The reason Vibrio fischeri is doing this comes from biology, which is another plug for sea animals.

Vibrio fischeri lives in this squid.

What you are looking at is a Hawaiian Bobtail Squid.

It's on its back and you can see these two shiny leaves.

These house the Vibrio fischeri cells.

They live there with high cell counts.

That molecule is there, producing light.

And the reason squids are willing to endure these pranks is because they want light.

How this symbiosis works is that this tiny squid lives in shallow, knee-deep water just off the coast of Hawaii.

And squid are nocturnal, so they sleep in the sand during the day.

But at night, they have to go hunting.

So on bright nights with lots of starlight or moonlight, that light can penetrate to the depths where squid live. Because it's in a few feet of water.

Squid has developed a shutter that can be opened and closed on a special photoorgan that houses bacteria.

And it has a detector on its back that can detect how much starlight and moonlight is hitting its back.

The shutter is then opened and closed so that the amount of light emitted from the bottom by the bacteria and the amount of light hitting the squid's back exactly match, so no shadows are cast on the squid.

In other words, the light from the bacteria is actually used to backilluminate the predator with an anti-predator device so that the predator cannot see its shadow and calculate its trajectory to eat.

So this is like a sea stealth bomber.

(Laughter) But when you think about it, this squid has a terrible problem. Because you have a dense culture of dying bacteria that you can't sustain.

So what happens is that each morning, when the sun rises, the squid goes back to sleep, burying itself in the sand, and pumps in time with its circadian rhythm.

When the sun rises, 95 percent of bacteria are expelled.

In other words, the bacteria had diluted and the tiny hormone molecules had disappeared, so there was no light.

But of course the squid doesn't mind and sleeps in the sand.

And as the day goes on, the bacteria double and release molecules, and at night the light comes on just when the squid wants it.

So we first figured out how this bacterium does this, but then we brought in the tools of molecular biology to figure out what the actual mechanism was.

And what we discovered, which is supposed to be my bacterial cell, is that Vibrio fischeri has proteins.

That's the red box. Small hormone molecules, enzymes that make red triangles.

And as cells grow, they are released into the environment, so there are a lot of them.

And the bacteria's cell surface also has receptors that fit like a keyhole with the molecule.

These are like receptors on the surface of cells.

So when the molecule increases to a certain amount, which corresponds to the number of cells, it locks into its receptors and information comes into the cells, telling them to turn on the collective action of emitting light.

This is interesting because over the past decade, we've learned that this isn't just an anomaly of this ridiculous glow-in-the-dark bacteria that lives in the ocean. All bacteria have such a system.

Now, what we do understand is that all bacteria can talk to each other.

They make up chemical words, recognize those words, and initiate collective actions that are successful only if all cells join in unison.

So we gave it a nice name. It's called "quorum sensing".

They use these chemical votes to vote, the votes are tallied, and then everyone reacts to the votes.

The point of today's story is that we know there are hundreds of actions that bacteria perform in such a collective fashion.

But perhaps the most important thing for you is toxicity.

It's not like a few bacteria enter your body and start secreting toxins. you are huge It won't affect you, you are huge.

But what we now understand is that what they are doing is entering the body, waiting, starting to multiply, counting themselves on these small molecules, and realizing that when they have the right cell count, if all the bacteria start their toxic attack together, they will succeed in overcoming their giant host.

Therefore, bacteria always control virulence through quorum sensing.

That's why.

Next, we investigated what these molecules were.

These were the red triangles on the previous slide.

This is the Vibrio Fischeri molecule.

This is the language it speaks.

And we started looking at other bacteria, but these are just a few of the molecules we found.

You can see that the molecules are related.

The left-hand part of the molecule is identical for all bacterial species.

However, the right-hand part of the molecule varies slightly from species to species.

This is meant to give these languages ​​an exquisite species specificity.

Therefore, each molecule fits its partner receptor and not the other.

So these are private, confidential conversations.

These conversations are for intraspecific communication.

Each bacterium uses a specific molecule, a language that allows it to count its siblings.

I thought that when we reached that point, we would begin to understand that bacteria exhibit such social behaviors.

But what we really thought was that most of the time bacteria don't live in isolation, but in an incredible mix of bacteria with hundreds and thousands of other species.

It's shown on this slide.

So this is just a picture - a micrograph of the skin.

Almost anywhere on the body looks like this.

You can see that all kinds of bacteria exist.

So we started to wonder if this was really all about bacterial communication and counting neighbors, then being able to talk only within the same species wasn't enough.

A method is needed to conduct surveys of the remaining bacteria in the population.

So we went back to molecular biology and started studying different bacteria.

And what we have now discovered is that bacteria are indeed multilingual.

They all have species-specific systems and have molecules that represent 'I'.

But running in parallel is a second system we found that is generic.

So they have a second enzyme that emits a second signal, it has its own receptor and this molecule is the bacterial language of trade.

It is used by all kinds of bacteria and is the language of communication between species.

What happens is that the bacteria can count how many "me"s and how many "yous".

They then take that information internally and decide which tasks to perform depending on who is in the minority and who is in the majority within a given population.

Then we turned to chemistry again to figure out what this common molecule was. That was the pink oval on my last slide. Here it is.

This is a very small, 5 carbon molecule.

And the important thing we learned is that every bacterium has exactly the same enzymes and makes exactly the same molecules.

So they all use this molecule for interspecies communication.

This is bacterial Esperanto.

(Laughter) So when we got to that point, we started to realize that bacteria could talk to each other in this chemical language.

But we started thinking that maybe we could do something practical here as well.

I told you that bacteria have all these social behaviors and communicate with these molecules.

Of course, I also told you that one of the key things they do is use quorum sensing to initiate virulence.

So we thought: What if these germs could no longer speak or hear?

Aren't these a new class of antibiotics?

And of course, you just heard and already know that antibiotics are in short supply.

Bacteria are now incredibly multi-drug resistant. That's because all the antibiotics we use kill bacteria.

They break the bacterial membrane or prevent the bacterium from replicating its DNA.

We kill bacteria with conventional antibiotics and select for mutants that are resistant to them.

And of course now we have a global problem of infectious diseases.

So we thought, what if we could change behavior? It just makes these bacteria unable to talk, unable to count, and unaware of their pathogenicity.

That's exactly what we did, and we took two strategies.

First, we targeted the intraspecific communication system.

So I created a molecule that resembled the real one. The actual molecule is slightly different.

They then lock onto those receptors, interfering with real recognition.

Therefore, targeting the red system will allow us to create species-specific or disease-specific antiquorum-sensing molecules.

I did the same with pink.

We changed that universal molecule a bit to create an adversarial interspecies communication system.

It is expected that they will be used as broad-spectrum antibiotics that act against all bacteria.

Finally, let's talk strategy.

This example only uses interspecies molecules, but the logic is exactly the same.

So what we do know is that when the bacterium enters an animal (in this case, a mouse), it doesn't immediately develop virulence.

It invades, begins to grow, and begins to secrete quorum-sensing molecules.

When enough bacteria are present, the animal realizes that the bacteria will start attacking it and it dies.

And what we can do is give these virulent infections, but in combination with antiquorum-sensing molecules.

These molecules are similar to the real thing, but slightly different. I have shown it on this slide.

What we currently know is that treating an animal with a pathogenic bacterium, a multidrug-resistant pathogen, at the same time as administering an antiquorum-sensing molecule, indeed allows the animal to survive.

So, we believe this is the next generation of antibiotics that will avoid this major problem of resistance, at least initially.

I would like you to consider that bacteria can talk to each other, use chemicals as words, and have incredibly complex chemical terms that we are just beginning to learn.

Of course, what this allows the bacteria to do is to become multicellular.

So, in the spirit of TED, they are doing things together to make a difference.

What happens is that bacteria have this collective behavior that allows them to perform tasks that could never be accomplished simply by acting as individuals.

What I wish I could argue further with you is that this is the invention of multicellularity.

Bacteria have existed on Earth for billions of years. Hundreds of thousands of humans.

Therefore, it is likely that bacteria made the rules for how multicellular tissues work.

And we believe that studying bacteria will provide insights into the multicellularity of the human body.

Therefore, it is hoped that if we can elucidate the principles and rules in this kind of primitive organism, we can apply them to other human diseases and human behaviors.

I hope you have learned that bacteria can distinguish themselves from others.

So with these two molecules you can say "I" and you can say "you".

And, of course, that's what we're doing, both in the molecular sense and in the external sense, but I'm thinking about the molecular thing.

This is exactly what is happening inside your body.

Not all heart cells and kidney cells mix every day. That's because the molecules that determine who each of these groups of cells are and what their respective roles are are undergoing chemical reactions.

Again, we think bacteria invented it and you just evolved a few more extras, but the whole idea is in these simple systems that we can study.

And finally, again, because of the practical part, we created antiquorum-sensing molecules that are being developed as a new kind of therapy.

But to complete the plug of all the good and miraculous bacteria living on Earth, we also created proquorum-sensing molecules.

So we targeted these systems to make the molecules work better.

Remember, you have 10x more bacterial cells in your body and body to keep you healthy.

Also, what we are trying to do is enhance the conversation between you and the bacteria that live as symbiotes, so that they can do what we want them to do better than they would on their own, in hopes of making you healthier and having better conversations.

Last thing I want to show you is my gang in Princeton, New Jersey.

Everything I told you was discovered by someone in that picture.

And hope when you learn things like how the natural world works. I just want to say that every time I read something in a newspaper or hear a story about something absurd in nature, it was done by a child.

So science is done by that layer.

These people, all between the ages of 20 and 30, are the driving force behind scientific discovery in this country.

And really lucky layers to work with.

(Applause.) I'm getting older and older, but they're always the same age.

And it's just crazy fun work.

And I would like to thank you for inviting me here. It is a great pleasure for me to participate in this conference.

(Applause.) Thank you.

(applause)

I am in the business of keeping secrets, and this includes yours.

Cryptographers are the first line of defense in the ongoing war that has raged for centuries: the war between codemakers and codebreakers.

And this is information warfare.

The modern information battlefield is digital.

And it happens through your cell phone, computer, and the internet.

Our job is to create a system that scrambles emails, credit card numbers, phone calls and text messages. This includes cheeky selfies (laughs). That way, all of this information can only be unscrambled by the intended recipient.

Now, until recently, we thought we had won this war once and for all.

Each of your smartphones now uses encryption that we thought was unbreakable, and will continue to do so.

we were wrong Because quantum computers are coming and will change the situation completely.

Throughout history, encryption and decryption have always been a cat-and-mouse game.

As far back as the 1500s, Mary Queen of Scots thought she was sending encrypted letters that only her soldiers could decipher.

But Queen Elizabeth of England had code-breaking devices everywhere.

They deciphered Mary's letter and found out that she was trying to assassinate Elizabeth, then decapitated Mary.

Centuries later, in World War II, the Nazis used the Engima cipher to communicate. The Engima cipher is a more complex encryption scheme that they considered unbreakable.

But good old Alan Turing, the same man who invented what we now call the modern computer, built the machine and used it to crack Enigma.

He deciphered the German message and helped stop Hitler and his Third Reich.

And this story has continued for centuries.

As cryptographers improve their encryption, codebreakers fight back and find ways to break it.

This war was a back and forth and very close.

That was until the 1970s, when some cryptographers made great strides.

They discovered a very strong encryption method called "public key cryptography".

Unlike all methods used so far, the parties sending confidential information do not have to exchange private keys beforehand.

The magic of public key cryptography is that it allows you to connect securely with anyone in the world, regardless of whether they've ever exchanged data, and connect so fast that neither you nor I realize it's happening.

Whether you're texting a friend to go out for a beer or transferring billions of dollars to another bank, modern encryption allows you to send secure data in milliseconds.

The brilliant idea that makes this magic possible relies on a difficult mathematical problem.

Cryptographers are deeply interested in what calculators can't do.

For example, a calculator can multiply any two numbers, no matter how large.

But go back and start with the product and ask, "Which two numbers multiply to get this number?" --That's actually a very difficult problem.

If I asked you to find out which two digits multiply to get 851, even with a calculator, most people in this room would have a hard time finding the answer by the time I'm done with this story.

And if the numbers are a little higher, there is no calculator on earth that can do this.

In fact, even the world's fastest supercomputer would take longer than the lifetime of the universe to find the two numbers that give this one.

Called "integer factorization", this problem is exactly what smartphones and laptops use today to keep data safe.

This is the basis of modern cryptography.

And the fact that all the computing power on the planet combined cannot solve this problem is why we cryptographers thought we had found a way to stay ahead of codebreakers forever.

Perhaps we got a little cocky because just when we thought we had won the war, a bunch of 20th-century physicists came to the party and revealed that the laws of the universe, the same laws that modern cryptography is built on, weren't what we thought they were.

We thought that one object could not exist in two places at the same time.

it's not.

We thought it was impossible for anything to rotate clockwise and counterclockwise at the same time.

But you are wrong.

And we thought that two objects on opposite sides of the universe could not be so light-years apart that they could affect each other instantaneously.

We were wrong again.

And isn't life always like that?

Just when you thought you had ducks lined up and covered everything, a bunch of physicists came along and revealed that the fundamental laws of the universe are quite different than you thought?

Look, in this tiny subatomic realm, at the level of electrons and protons, the classical laws of physics we all know and love go out the window.

And here the laws of quantum mechanics come into play.

In quantum mechanics, electrons can rotate clockwise and counterclockwise at the same time, and protons can be in two places at the same time.

It sounds like science fiction, but that's because the crazy quantum nature of our universe is hiding from us.

And it remained hidden from us until the 20th century.

But now the whole world is in an arms race to build quantum computers, computers that can harness the power of this strange and quirky quantum behavior.

They are so innovative and powerful that today's fastest supercomputers seem useless by comparison.

In fact, today's fastest supercomputers are more like abacuses than quantum computers when it comes to certain problems that are of great interest to us.

Yes, I'm talking about the little wooden thing with the beads.

Quantum computers can simulate chemical and biological processes that are inaccessible to classical computers.

So they promise to help us solve some of the biggest problems on earth.

They will help us fight global hunger. Address climate change. Finding cures for previously unsuccessful diseases and pandemics. Create superhuman artificial intelligence. And perhaps more important than all of them, they will help us understand the very nature of the universe.

But with this incredible potential comes incredible risk.

Remember those big numbers we talked about earlier?

I'm not talking about the 851.

In fact, if anyone here is distracted trying to find these factors, I'm going to pull you out of your misery and tell you it's 23×37.

(Laughter) I'm talking about the bigger numbers that follow.

Today's fastest supercomputers have been unable to find these factors in the lifetime age of the universe, but quantum computers can easily factor much larger numbers.

Quantum computers will break all currently used cryptography to keep you and me safe from hackers.

And they do it easily.

I will say this. If quantum computing is a spear, modern cryptography is like a shield made of tissue paper, the same unbreakable system that has protected us for decades.

Anyone with access to a quantum computer has the master key to unlock anything they want in the digital world.

They could steal money from banks and control the economy.

It could turn off hospitals or launch nuclear weapons.

Alternatively, they can just sit back and watch us all on webcams without any of us realizing this is happening.

Now, the basic unit of information on all computers with which we are familiar is called a 'bit', as in this computer.

A single bit can be in one of two states. 0 or 1.

When I FaceTime my mom on the other side of the world, she's going to kill me if I have this slide. (Laughter) We're really just sending each other long sequences of 0's and 1's, jumping from computer to computer, satellite to satellite, sending data at high speed.

Bits are really useful.

In fact, everything we do with technology today is thanks to the usefulness of bits.

However, we are beginning to realize that Bits are very bad at simulating complex molecules and particles.

And this is, in a way, because subatomic processes obey the strange rules of quantum mechanics, but can do two or more contradictory things at the same time.

So, in the second half of the last century, some really smart physicists came up with the ingenious idea of ​​building a computer based on the principles of quantum mechanics instead.

The basic unit of information in a quantum computer is called a "qubit".

Abbreviation for "qubit".

A qubit can have an infinite number of states, rather than just two states, such as 0 or 1.

And this corresponds to the simultaneous combination of both zeros and ones, a phenomenon called "superposition".

And when you superimpose two qubits, you're actually working across all four combinations: zero-zero, zero-one, one-zero, and one-one.

With three qubits, you're working with eight combinations on top of each other.

Every single qubit we add doubles the number of combinations we can work on simultaneously in superposition.

Therefore, scaling up to handle many qubits allows us to handle an exponential number of combinations at the same time.

And this just hints at where the power of quantum computing is coming from.

Now, a private key in modern cryptography is just a long sequence of 0's and 1's, much like the two elements of a large number.

To find them, a classical computer must go through all the combinations one by one until it finds one that works and breaks the encryption.

However, with quantum computers, we can extract information from all combinations simultaneously, provided we have enough qubits for superposition.

In just a few steps, a quantum computer can ward off all wrong combinations, find the right ones, and unlock our deepest secrets.

Something truly incredible is happening here on a crazy quantum level right now.

The conventional wisdom held by many leading physicists is that each combination is actually tested by its own quantum computer in its own parallel universe.

Each of these combinations builds up like a wave in a puddle.

Wrong combinations cancel each other out.

And when paired correctly, they reinforce and amplify each other.

Therefore, at the end of any quantum computing program, all that remains is the correct answer, which we can observe in this universe.

Don't stress if it doesn't make sense to you completely.

(laughs) Good friends.

Niels Bohr, one of the pioneers in the field, once said that anyone who can ponder quantum mechanics without being deeply shocked has not understood it.

(Laughter) But I hope you understand what we're up against and why it's up to us cryptographers to make it even stronger.

Quantum computers are already in labs around the world, so we need to do it quickly.

Fortunately, at the moment they exist on a relatively small scale, still too small to crack much larger cryptographic keys.

But we may not be safe for long.

Some people believe that the secret government agency has already built something big enough, but they just haven't told anyone yet.

Some experts say it's a decade away.

Some say around 30.

You might think that if quantum computers are 10 years away, that's plenty of time for us cryptographers to figure it out and secure the internet.

But unfortunately it's not that easy.

Even ignoring the years of standardization, adoption and deployment of new encryption technologies, it may already be too late in some ways.

Savvy digital criminals and government agencies may already be storing some of the most sensitive encrypted data as they look ahead to the upcoming quantum future.

Messages from foreign leaders, generals, or individuals questioning power are currently encrypted.

But as soon as the day comes when someone has a quantum computer, they can go back in time and destroy everything.

Certain governments, financial sectors, or military organizations require sensitive data to remain confidential for 25 years.

So if quantum computers really exist 10 years from now, they are already 15 years too late to prove cryptography quantumly.

So while many scientists around the world are racing to build a quantum computer, we cryptographers are rushing to reinvent the cryptography that will protect us long before that day comes.

We are looking for new and difficult math problems.

We're looking for problems that can be used on today's smartphones and laptops, just like factorization.

But unlike factorization, these problems must be too difficult for even a quantum computer to solve.

In recent years we have explored a much wider area of ​​mathematics to look for such problems.

We have seen numbers and objects that are far more exotic and far more abstract than what you and I are familiar with, such as those displayed on calculators.

And we believe we have discovered some geometric problems that might solve it.

Unlike the 2D and 3D geometry problems you had to solve in high school with pen and graph paper, most of these problems are now defined in well over 500 dimensions.

Therefore, we think that drawing them on graph paper and solving them is not only a bit difficult, but also outside the reach of quantum computers.

So, while still in its early stages, we place our hopes here to secure the digital world as we move into a quantum future.

We cryptographers, like all other scientists, are very excited about the possibilities of a world that can coexist with quantum computers.

They can be a great force for good.

But no matter what technological future we live in, our secrets will always be part of our humanity.

And it's worth preserving.

thank you.

(applause)

Hi.

It wasn't because I lost the bet.

Many years ago I had a bad burn.

Scars cover most of his body, including the right side of his face.

I just don't have hair. That's exactly what happened.

Anyway, now that we've talked about facial hair, let's move on to the social sciences.

And in particular, I want you to think about where humanity's potential lies, and where we are now.

If you think about it, there's a huge gap between what we think we're doing and where we are, and it exists in every field.

So my question is, how many of you have eaten more than you need in the past month?

Just common. OK.

How many of you have been exercising less than you expected in the past month?

Now, how many of you said that raising your hand twice was your greatest exercise today?

(Laughter) How many of you have ever texted while driving?

Okay, let's be honest. Test your honesty.

How many people here last month didn't wash their hands every time they came out of the bathroom?

(Laughter) It's a little unhonest.

By the way, it's interesting that we happily admit texting and driving but don't wash our hands. It is difficult.

(laughter) I can go on and on.

The problem is, the subject is that when we know what we can do, we can do a lot -- we can be very, very different, but we act in very different ways.

And when thinking about how to fill that gap, the usual answer is "just tell people."

For example, tell them that texting or driving is dangerous.

Did you know it's dangerous? You shouldn't do that.

When you tell people something is dangerous, they stop.

Examples include sending emails and driving a car.

Another very sad example is that the US spends $700-800 million a year on so-called "financial literacy."

And what do you get as a result?

There was recently a study, a so-called meta-analysis, that examined all the research ever done on financial literacy.

And what they discovered is that when you teach people financial literacy, they learn and remember.

But do people do it? Not so much.

The improvement immediately after the course is about 3-4%, but then declines.

And after all, the improvement is about 0.1 percent. Not zero, but as close to zero as humanly possible.

(Laughs) So this is sad news.

The sad news is that informing people is not a good way to change behavior.

What is

The social sciences have come a long way, and the basic insight is that if we want to change behavior, we must change the environment.

The right way is not to change the person, but to change the environment.

And I would like to present a very simple model of how to think about it. It's about thinking about changing behavior the same way you think about sending rockets into space.

When we think about sending rockets into space, we want to do two main things.

The first is to reduce friction.

We use rockets and want to have as little friction as possible and be as aerodynamic as possible.

And second, we want to carry as much fuel as possible to give you the most motivation and energy to carry out the mission.

And so is behavior change.

So let's talk about friction first.

In the particular case study I'm going to tell you about, I have a pharmacy, an online pharmacy.

Imagine you go to the doctor.

If you have a long-term illness, your doctor prescribes you medicine, and you register with this online pharmacy, you will receive your medicine in the mail every 90 days.

Every 90 days, medicine, medicine, medicine.

And this online pharmacy wants to switch people from branded drugs to generics.

So they sent letters to people and said, 'Please, please, please switch to generics.

You save money, we save money, and your employer saves money. ”

And what do people do?

none.

So they try all sorts of things, but nothing happens.

So they give people great offers for a whole year.

They send letters to people and say, "Switch to generics now and get a year free."

Free all year round. wonderful!

What percentage of people do you think have switched?

less than 10 percent.

At this point they show up at my office.

And they come to complain.

why did they choose me?

I have written several papers on "free attraction".

These papers showed that, for example, if you cut the price of something from 10 cents to 1 cent, nothing much happens.

Reduce it from 1 cent to 0 cents and people get excited.

(Laughter) And they said, "Look, we read these papers about 'free' and gave 'free'." It didn't work as expected.

what happened? "

I said, "You know, maybe it's a friction issue."

They said, "What do you mean?"

I said, 'People start with brands.

They can't do anything and end up being branded.

Moving to generics requires choosing generics over branded products, but it also requires doing something.

They have to return the letter. ”

This is what we call "confusing design".

Two things are happening at the same time.

There is a difference between brands and generics, but there is a difference between doing nothing and doing something.

So I said, 'Why don't you switch?

Why not send a letter to people and tell them you're switching to generics?

No action is required.

If you want to stay with the brand, return the letter. (laughs) Right?

what do you think happened?

Lawyers, lawyers happened.

(Laughter.) As it turned out, this was illegal.

(Laughter) By the way, when it comes to brainstorming and creativity, it's okay to do things that are illegal and immoral during the brainstorming stage.

(Laughter) But this was the purity of the idea. Because the first designs were branded and benefitted without doing anything.

In my illegal and immoral design, generics had the advantage of taking no action.

But they agreed to give people a T-junction. This means sending letters to people and saying, 'If you don't return this letter, I will have to stop taking the medicine.

But when returning the letter, you can choose a branded product at this price, or a generic product at this price. ”

Now people had to act.

They were evenly matched. right?

It's not like you're doing nothing and making a profit.

What percentage do you think has switched?

Most have switched.

So what does it tell us?

Do people prefer generics or branded products?

We hate returning letters.

(Laughter) This is a story of friction. It's the little things that really matter.

And friction is about taking the desired action and saying, "Where is too much friction slowing people down?"

And every time we notice a mismatch between desired and easy behaviors, it means we try to realign them.

That's the first part. We talked about friction.

Now let's talk about motivation.

In this particular study, we tried to get some very poor people from a slum called Kibera in Kenya to save a little money for a rainy day.

Sometimes bad things happen when you are very, very poor, have no extra money, and live hand to mouth.

And when something bad happens, you have nothing to turn to and you end up in debt.

People in Kibera can borrow at interest rates of up to 10 percent a week sometimes.

And of course it's really hard to get out of there.

You live from day to day, something bad happens, you go into debt and things get worse and worse.

So we wanted people to save a little money for rainy days.

And then I wondered what the motivation was and what fuel I needed to add.

And we tried all sorts of things.

I texted some people once a week and said, "Try to save 100 shillings (about $1) this week."

Some even texted as if they were from children.

So it said, "Hello mother, hello father, this is little Joey"--whatever the child's name is--"Save a hundred shillings this week for the future of our family."

right? I'm Jewish, so a little guilt always works.

(Laughter) Some people got 10 percent.

"If you save up to 100 shillings, I'll give you 10 percent."

Some even got 20 percent.

Some people got 10% and 20%, but they did it with loss aversion.

What is loss aversion?

Loss aversion is the idea that you hate losing more than you enjoy gaining.

Now consider a person who is in the 10 percent state and has invested 40 shillings.

They gave us 40 shillings so we gave them another 4 shillings and they say thank you very much.

The man gave up six times.

Give them 100 and they might get 6 more, but they don't know.

So we created a so-called pre-match.

I deposited 10 shillings at the beginning of the week.

We said, "We are waiting!"

And if someone puts in 40, we say, "Oh, you put in 40. We leave 4 and take 6 back."

So people get 10% in both cases, pre-match and post-match.

But before the match, we will see the unmatched money out of our account.

So you have texts from kids, 10 percent, 20 percent, pre-game, and post-game.

And there was another condition.

It was a coin about this size with 24 numbers on it.

And we tell them to put that coin somewhere in the shed and take a knife and scratch off that week's number each week. Weeks 1, 2, 3, 4, if it was not preserved, make a scratch like a minus, and if it was preserved, make a scratch on the top and bottom.

Well, think about it. Which of these methods do you think is the most effective?

Text, text from kids, 10 percent, 20 percent, start of week, end of week and coin?

I'll tell you what normal people think.

We have conducted these predictive studies in both the United States and Kenya.

People think that 20 percent will do more, 10 percent will do less, and the rest will do nothing.

People think the impact of loss aversion is small.

What actually happened?

Sending a text reminder once a week helps a lot.

Good news!

This program lasted for 6 months. people forget. It's great to remind people.

10% was even more helpful on weekends.

Financial incentives work.

20 percent on weekends. Exactly the same as 10 percent, no difference.

Using 10 percent at the beginning of the week works even better.

Loss aversion works.

The 20 percent at the beginning of the week is the same as the 10 percent at the beginning of the week, no difference.

And texting from kids was as effective as 20% plus loss avoidance. Isn't this amazing?

I was surprised that the messages from the children were so encouraging.

And one conclusion is that we are not making full use of our children.

(Laughter) Of course, I don't mean child labor.

But when I think about parents and their children, I think we should do what's best for our children, think about the future, and think about how we can use that amazing source of motivation to get them to do better.

But the big surprise of this study was the coin.

Basically, this coin doubled the savings compared to everything else.

And now the question is "why?" what happened to the coins?

So let me tell you how I got started thinking about coins, and then I'll get back to you.

This means you don't have to go anywhere to do some research, like buy coffee. You can sit in your office.

I bought enough coffee. i know how it works.

I know the details very well.

If you're doing research in the poorest parts of the world, you have to go and see it and gain insight into how the system works.

And that day, I was in a place called Soweto, South Africa, sitting at a place that sells funeral insurance.

As you know, Americans spend an insane amount of money on weddings.

Funerals in South Africa.

People spend up to a year or two of their income on funerals.

And here I am sitting. By the way, before you decide that South Africans are irrational about this, remember that they spend a lot more money on funerals than they do on weddings, but at least there's only one wedding.

(Laughter.) Okay, so I'm sitting here selling funeral insurance.

And this guy comes in with his son, who's about 12 years old, and takes out funeral insurance for a week.

Covers 90% of funeral costs only if the insured dies within the next seven days.

right? They are very poor and buy a small amount of insurance and a small amount of soap etc.

And he takes the certificate and gives it to his son in a very polite way.

And when he passes it on to his son, I think to myself, why do we need this ritual?

what is this father doing?

Now think of the breadwinner who decides to put some money towards insurance and savings that day.

What is your family going to see tonight?

they will see less.

right? At that level of poverty, we have less food, less kerosene, less water, and something less tonight.

And what his father was doing, and what our coins were going to do, is say yes, there's less food on the table, but there's another activity.

What happened is that there are a lot of good, invisible economic activities that matter, like savings and insurance.

Now the question is how to visualize them.

Now let's go back to the rocket model.

First of all, you have to look at the system and see where there are small points that can be fixed with friction, and where there are points where friction can be removed.

And the next thing we want to do is think broadly about the system and say, "What other motivations can we incorporate?"

And it's a much harder task, and I don't always know what works best.

Will it make money? Will it be loss aversion?

Will it become visible?

I don't know, so I'll have to try different things.

We also have to recognize that our intuition sometimes misleads us.

We don't always know what works best.

So when you think about the gap between what we could be and what we are, it's really sad to see this gap and think about it.

But the good news is that there are many things we can do.

Some changes are simple, others are more complex.

But if we can address each issue directly, not just by giving people more information, but by trying to change friction and increase motivation, I think we can...

But can we do better? Absolutely.

thank you very much.

(applause)

The god of technology, Hephaestus, was enthusiastic about the most original inventions ever.

He was building a new defense system for King Minos, who wanted to reduce intruders to his kingdom on Crete.

But mortal guards and ordinary weapons weren't enough, so a visionary god devised an indomitable new protector.

Hephaestus cast his invention in the form of a giant in the forge fire.

Made of shining bronze. Endowed with superhuman strength and powered by Ichor, the life-fluid of the gods, this automaton was unlike anything Hephaestus had ever forged.

God named his creation Talos, the first robot.

Three times a day, the Bronze Guardian marched around the island looking for intruders.

When he spotted a ship approaching the shore, he threw a huge boulder in its path.

If any survivors managed to land, he heated his metal body to a bright red and crushed his victims to his chest.

Talos was determined to carry out his mission day in and day out.

But despite his robot-like behavior, he had an inner life that his victims could hardly imagine.

And soon this behemoth will encounter an invader ship that will test his bravery.

A limping crew of Jason, Medea, and the Argonauts has returned from a hard-won quest to retrieve the Golden Fleece.

Their adventure took many dark turns, and the weary sailors desperately needed a safe harbor to rest.

They heard tales of the Immortal Bronze Colossus of Crete and headed for a sheltered cove.

Before they could drop anchor, however, Talos discovered them.

While the Argonauts cringed at the approach of the terrifying automaton, the sorceress Medea spotted a glowing bolt in the robot's ankle and devised a clever ruse.

Mediah offered Talos a deal, claiming that Talos could be made immortal in exchange for removing the bolts.

The promise of media resonated deep in his heart.

Talos agreed, unaware that he himself was of a mechanical nature and was human enough to thirst for eternal life.

Jason unbolted while Medea cast a spell.

As suspected by the media, the bolt was a weak point in Hephaestus' design.

Ichor flowed like molten lead, draining the source of Talos' power.

The robot collapsed with a thunderclap, and the Argonauts were free to return home.

First documented around 700 B.C., the story raises common anxieties about artificial intelligence and even provides an ancient blueprint for science fiction.

But historians say ancient robots were more than just a myth.

By the 4th century B.C., Greek engineers began building real automatons, such as robotic servants and flying models of birds.

None of these works was as famous as Talos, who appeared on Greek coins, vase paintings, public frescoes, and plays.

Even 2,500 years ago, the Greeks had already begun exploring the uncertain boundaries between humans and machines.

And like many modern myths about artificial intelligence, Talos' story is as much about a robotic brain as it is about his robotic heart.

One painter of Talos' death on a 5th century BC vase depicted the despair of a dying automaton with tears streaming down his bronze cheeks.

Think about your nails.

Common in quadrupeds around the world, it is one of nature's most versatile tools.

Bears use their claws not only for defense, but also for burrowing.

The eagle's needle-like claws can pierce the skull of its prey.

And lions can retract their huge claws for ease of movement before extending them to hunt.

Our primate ancestors also wielded this impressive appendage before claws evolved into claws.

So what in our evolutionary past led to this well-groomed adaptation, and what can claws do that their sharper relatives can't?

When claws first appeared in the fossil record about 55.8 million years ago, claws were already present in the ancestors of mammals and reptiles over 260 million years ago.

But despite the time gap between their appearances, both of these adaptations are part of the same evolutionary story.

Both fingernails and toenails are made of keratin. Keratin is a tough, fibrous protein that is also found in horns, scales, hooves, and hair.

This protein is produced by a wedge of tissue called the keratin matrix.

Rich in blood vessels and nutrients, this protein factory produces an endless stream of keratin, which is tightly packed into cells called keratinocytes.

These dense cells give nails and toenails their trademark toughness.

Keratinocytes are generated in the same way in both adaptations, since fingernails evolved from fingernails.

Cells grow out of the matrix, die out of the skin, and harden into a water-resistant sheath.

The main difference between the two keratin coatings is actually their shape, which depends on the shape of the end bones of the animal's fingers.

In the nail, a bed of keratinocytes fits into the narrow finger bone, wraps around the edge of the finger, and radiates outward to form a cone-shaped structure.

Clawed animals, on the other hand, have much wider digits, with keratinocytes covering only the top surface of the wider bones.

As a side effect of primate digits evolving to be wider and more dexterous, the claws may simply remain.

But given what we know about our primate ancestral habitats, it's more likely that nails had powerful advantages of their own.

High in the forest canopy where these primates lived, the wide finger bones and wide finger pads were perfect for grasping thin branches.

And thanks to the nails, its gripping power has been further improved.

Providing a hard surface to press against allowed the primate to expand its paws to make even more contact with the tree.

Additionally, the claws improved finger sensitivity by providing an additional surface for detecting changes in pressure during climbing.

This combination of sensibility and dexterity enabled our ancestors to have the precise motor control needed to catch insects, pinch fruit and seeds, and grip thin branches.

The evolution of the nail and the evolution of the opposing thumb and toes are closely related.

And when our ancestors descended from trees, this flexible grasp enabled them to create and use complex tools.

Even if broad fingers were capable of holding claws, their sharp tips might have interfered with the normal tasks of these primates.

Claws are great for piercing, piercing, and hooking, but their tips make them difficult to grasp and potentially dangerous.

However, both nails and nails are sometimes used in unexpected places.

Manatees use their claws to grab food, and researchers suspect elephant toenails can sense ground vibrations to aid hearing.

Other primates, like the aye-aye of Madagascar, have regained their claws.

They use their very long appendages to tap branches and trunks, listening for cavities with bat-like ears.

When they hear a burrowing sound, they burrow into the tree and skewer the larvae with their needle-like middle fingers.

We've only scratched the surface of all the amazing ways claws and claws are used across the animal kingdom.

But which of these adaptations is better?

That's the answer we may never be able to identify.

The old story about climate protection is that it will cost or would have already been done.

So the government needs to make us do painful things to solve it.

The new story about climate protection is that it's not costly, it's profitable.

This was a simple coding error. Because, as companies that do this all the time (e.g. Dupont, SD Microelectronics, etc.) know well, it's cheaper to save fuel than to buy it.

Many other companies (IBM) routinely reduce their energy intensity by 6% per year by retrofitting their plants, with a payback period of 2-3 years.

It's called profit.

Now, similarly, the old story about oil is that the market is essentially perfect, so if you wanted to save a lot of oil it would be expensive or you would have already done it.

Of course, if that were true, innovation wouldn't happen and no one would make money.

But the new story about oil is that governments don't have to force us to do painful things to get out of oil -- not incrementally, but completely -- quite the opposite. The United States, for example, could eliminate the use of oil entirely and at the same time revitalize its economy with profit-seeking businesses. This is because it is much cheaper to save and replace oil than to keep buying it.

This process will also be facilitated by the military for the unique reasons of combat effectiveness and prevention of conflicts, especially over oil.

This paper is in the book "Winning the Oil Endgame" written by me and four colleagues and is freely available on Oilendgame.com and has been downloaded about 170,000 times so far.

And it was co-sponsored by the Department of Defense. It's independent, peer-reviewed, and all backup calculations are transparently posted for your viewing.

Now, I think a little economic history might help here.

Around 1850, one of America's largest industries was whaling.

And almost every building was lit with whale oil.

But in the nine years before Drake tapped for oil in 1859, at least five-sixths of the market for whale oil had disappeared, thanks to deadly competitors in oil and gas, mostly made from coal, that whalers didn't pay attention to.

So quite unexpectedly, they ran out of customers before the whales ran out.

The remaining whale populations were saved by technological innovators and profit-maximizing capitalists.

(Laughter.) And funny thing, I feel a little bit similar now with oil.

We've spent the last few decades building a backlog of extremely powerful technologies for oil conservation and substitution, and so far no one has tried to stack it.

So I did some research and found some really surprising things.

Now, there are two big reasons to worry about oil.

Both national competitiveness and national security are at risk.

In terms of competitiveness, we all know that Toyota's market capitalization is greater than the big three combined.

And there is fierce competition from Europe, South Korea, and China, which will soon become a major net exporter of cars.

How long do you think it will be before you can drive home a new Wall-E-badged Shanghai Motor super-performance car?

Friends in Detroit say it will probably take 10 years.

China's energy policy is based on radical energy efficiency and breakthrough technology.

They're not going to export your uncle's Buick.

And then India.

The point here is that these cars are made super efficient.

The question is, who will make it?

Will we continue to import efficient cars to replace foreign oil, or will we build efficient cars and import neither oil nor cars?

It seems to me that it makes more sense.

As we continue to use oil, especially imported oil, we face a very obvious set of problems.

Our analysis assumes they are all costless, but none of the numbers are correct.

For example, it has enough potential to double oil prices.

And one of the worst of them is, if other countries think that everything we do is for oil, if we have to treat the countries that have oil differently than the ones that don't, how does that affect where we stand in the world?

And our military is so frustrated that it has to stand guard on pipelines in faraway Istanbul when what they actually signed up for was to protect the American people.

They don't like fighting over oil, they don't like being on the beach, they don't like where oil money goes and what kind of instability it creates.

Now, to avoid these problems, it's really not that complicated for whatever value you think it's worth.

By using oil more efficiently, we can save half the oil at a cost of $12 per barrel we save.

And the other half can be replaced with a combination of advanced biofuels and safer natural gas.

And that cost averages less than $18 a barrel.

And compared to official projections, oil prices will hit $26 a barrel in 2025, half of what we're paying these days, and $70 billion in annual savings is just around the corner.

About $180 billion needs to be invested to make this happen. Half of that will go to restructuring the car, truck and aircraft industries. Half of it will be used to build an advanced biofuel industry.

In the process, it will create about 1 million quality jobs, mostly in rural areas.

And protect another million jobs now at risk, mainly in car manufacturing.

And it will generate more than $150 billion in annual profits.

That's a great return.

Funding is available in the private capital market.

But for the reasons I just mentioned, if you want to do it faster and with more confidence, and to expand your options and manage your risks, you might prefer a light-hearted public policy that supports rather than distorts or opposes business logic.

And these policies work well without taxes, subsidies, or obligations.

They bring a little net profit to the treasury.

These have broad appeal beyond ideology, and we want to make it real, so we've come up with a way that doesn't require federal law and can actually be done at the executive or state level.

To illustrate what to do about the heart of the matter, light vehicles, here are four concept cars in low-drag, ultralight carbon composites. All but the one in the upper left are hybrid drives.

All these things can be aligned.

For example, this Opel two-seater goes 155 miles per hour at 94 miles per gallon.

This muscle car from Toyota is super light, puts out 408 horsepower, goes from 0 to 60 in well under 4 seconds, and still does 32 miles per gallon. More on this later.

And on the top left is a pioneering effort by GM 14 years ago that achieved 84 miles per gallon for four without a hybrid.

Well, when you save fuel, 69% of light car fuel costs about 57 cents per gallon saved.

But for big trucks it's even better. You can save a similar amount of money at 25 cents per gallon, with improved aerodynamics, tires, engine, and more, and less weight to fit your payload.

So you can double your efficiency with an internal rate of return of 60%.

In addition, improved operations can nearly triple efficiency and double profits for major carriers.

And we hope to use these numbers to drive demand and turn the market around.

It's a similar story in the aircraft business, where the first 20% fuel savings are free, as Boeing is currently demonstrating with its new Dreamliner.

But next-generation planes will save about half.

Again, much cheaper than buying fuel.

And over the next 15 years or so, moving to a mixed wing body like a flying wing with an internal engine will provide about a 3x efficiency gain at the same or lower cost.

Let's focus a little bit on light cars, passenger cars and light trucks. Because we all know best about them. Probably everyone here drives a car.

But what we may not realize is that in a standard sedan, seven-eighths of the fuel energy delivered to the cabin is never delivered to the wheels. It's lost first in the engine, idling at 0 miles per gallon, powertrain, and accessories.

So, of the energy that reaches the wheels, only one-eighth, or half, heats the tires on the road or the air that the car pushes to the side.

And only 6% heat the brakes when actually accelerating the car to a stop.

In fact, 95 percent of the weight you're moving is the car, not the driver, so less than 1 percent of the fuel energy is ultimately used to move the driver.

After more than a century of intense engineering effort, this is not very welcome.

(Laughter) (Applause) And three-quarters of fuel use is caused by the weight of the car.

And, as you can see from this figure, for every unit of energy you save on the wheels, you won't waste another 7 units of energy to supply that energy to the wheels.

Therefore, significantly reducing the weight of the car has a significant impact.

And the reason this hasn't been taken very seriously before is that there was a common assumption in the industry that it might not be safe to be run over by a heavy vehicle, and that it would cost a lot more to manufacture. Because the only way I knew how to make a car much lighter was with expensive light metals like aluminum and magnesium.

However, these objections are now disappearing due to advances in materials.

For example, we use a lot of carbon fiber composites in our sporting goods.

And these turned out to be quite remarkable with respect to safety.

This is a handcrafted McLaren SLR carbon car watered down by Golf.

Golf was totaled.

The McLaren popped out and scratched the side panel.

I'll put it back on later to repair the scratch.

But if this McLaren were to hit a wall at 105 mph, the entire impact energy would be absorbed by two carbon fiber composite fiber woven cones hidden in the front end weighing a total of 15 pounds.

Because these materials can actually absorb 6 to 12 times more energy per pound than steel and do it more smoothly.

This means that we have overcome the challenges of safety and weight.

The bigger the car, the more protective it is, and the lighter it is.

On the other hand, making them heavy makes them hostile and inefficient.

And if you lighten it the right way, it's easier and cheaper to make.

You can ultimately save money, lives and oil all at the same time.

Two years ago, I showed you a little bit about a basic, no-compromise, 5x-efficiency suburban assault vehicle design -- (laughter) -- which is a fully virtual design that could be manufactured at production cost.

And the processes required to make it are actually very well brought to market.

We figured out a sort of digital inkjet printer for this very stiff and strong carbon composite, and then figured out how to thermoform it. Because it's a combination of carbon and nylon, it can be molded into any intricate shape you want, like one of our Tier 1 suppliers just showed at a car show.

And the manufacturing that can be done in this way is radically simplified.

Because a car body doesn't have 100 or 150 parts, it only has 14 parts, for example.

Each is formed with one fairly inexpensive die set instead of four more expensive die sets for pressing steel.

Each part can be easily lifted without a hoist.

Snaps together like a child's toy.

That's why I quit the body shop.

If you want, you can even put the color in the mold and eliminate the paint shop.

These are the two most difficult and costly parts of building a car.

That means it will be at least two-fifths less capital-intensive than GM's leanest plant in the industry in Lansing.

The plants will also become smaller.

Now, if we do a similar analysis for all uses of oil - buildings, industry, feedstocks - we find that of the 28 million barrels per day the government says it will need in 2025, about 8 barrels can be efficiently removed by then, and another 7 barrels are still being saved as auto inventories turn over, for an average cost of only $12 per barrel instead of $26 for oil purchases.

In addition, another six can be produced powerfully and competitively from cellulosic ethanol and small amounts of biodiesel without any interruption to the water and land needed for crop production.

The amount of gas to be saved is enormous, about one-eighth the price, and about half the planned gas.

And here are some easy replacements for it that have plenty left.

In fact, after processing domestic oil forecasts from regions that have already been approved, there is only a little bit left. We have a fairly flexible menu of methods, so let's see how we can meet that.

Of course, you can also be more efficient.

Perhaps you should buy efficiency for $26 instead of $12.

Or wait until you capture the second half.

Or, of course, we could get some of this by continuing to import Canadian or Mexican oil, or the ethanol that Brazilians want to sell.

But they would sell it to Japan and China instead. Because we have tariff barriers to protect corn farmers, and they don't.

Alternatively, you can use the saved gas directly to cover all of this balance. Alternatively, the more profitable and efficient use of hydrogen also eliminates the need for domestic oil.

And that doesn't even take into account whether the available land in Dakota, for example, could cost-effectively generate enough wind power to power every highway vehicle in the country.

Therefore, we have many options.

Menu and timing choices are very flexible.

Now, there are several ways governments can help make this happen faster and with greater confidence.

For example, a combined commission and rebate fee on any size class of vehicles could increase the price of inefficient vehicles and pay rebates to efficient vehicles accordingly.

There is no compensation for size class changes.

Efficiency choices within a size class are rewarded in a similar way to looking at fuel savings over the entire lifecycle, not just the first couple of years.

This will rapidly expand the market choice and actually generate more profit for automakers as well.

I want to address the lack of affordable personal mobility in this country by giving low-income families access to new, efficient, reliable, and warranted vehicles at very low prices that they would never otherwise get.

And for each car so funded, scrap roughly one junk car, preferably the dirtiest car.

This will create a new car market of 1 million vehicles per year in Detroit from customers who otherwise could not have been reached because they lacked credit and could not afford a new car.

And Detroit will benefit from every unit.

For example, it was found that when African-American and white households owned the same car, it improved access to job opportunities and cut the employment gap by about half.

So this is also a big win socially.

Governments buy hundreds of thousands of cars a year.

There are clever ways to buy them and aggregate their purchasing power to bring highly efficient vehicles to market faster.

And you can make an X Award-style golden carrot that's worth further development.

For example, the first U.S. automaker to sell 200,000 of the highly advanced vehicles we just saw will be awarded a $1 billion prize.

As such, traditional airlines cannot afford to buy new, more efficient planes so desperately needed to reduce fuel costs. But if you feel like doing something about it philosophically, there are ways to raise money.

And at the same time, scrapping inefficient old planes wastes more oil and prevents the introduction of efficient new planes if they do return to the skies.

Airplanes inefficient in those parts are worth more to society dead than alive.

We should bring them back and shoot them and let the bounty hunters go after them.

Then there is the important military role.

In creating a transition to high-volume, low-cost commercial production of this kind of material, and for that matter the superior backup technology, ultra-light steel, the military could do tricks like they did in turning DARPAnet into the Internet.

Just leave it to the private sector and you'll have the internet.

So is GPS.

So is the modern semiconductor industry.

In other words, the military science and technology they need can transform the civilian economy and create advanced materials industrial clusters that liberate the nation from oil, which will contribute significantly to ending oil conflicts and promoting national and global security.

Next, we need to reconfigure and retrain the automotive industry, shift the convergence of energy and agriculture value chains to accelerate the transition from hydrocarbons to carbohydrates, and get out of our own ways in other ways.

Plus, it speeds up the transition to more efficient vehicles.

But here's how the whole thing fits together.

Instead of the official forecast that oil use and oil imports will rise forever, they could fall at an efficiency of $12 a barrel, and could fall significantly with the addition of $18 supply-side substitution, all at a slower rate than when we were previously paying attention.

And if we start adding tranches of hydrogen to that, imports will disappear rapidly in the 2040s, and oil will disappear entirely.

I just want to point out that I've done this before.

In the eight years we last looked at, 1977-85, the economy grew 27 percent, oil use fell 17 percent, oil imports fell 50 percent, and oil imports from the Persian Gulf fell 87 percent.

One more year and they would be gone.

Well, it used very old technology and delivery methods.

Now we can replay that play better.

Yet what we proved then was that the US has greater market power than OPEC.

Ours is on the demand side.

We are the Saudi Arabia of 'Negabarrels'. (Laughter) We can use less oil faster than they can conveniently sell less oil.

(Applause.) Whatever reason you want to do this, whether you're concerned about national security or price volatility (Laughter), whether you're worried about jobs, the planet, or your grandchildren, it seems to me that this is the oil end goal we all must work to win.

Please download a copy. thank you.

(applause)

I talk about myself, but I rarely talk about it because I like to talk about what I know nothing about—well, in part.

And second, I am a recovering narcissist.

(Laughs) I actually didn't know I was a narcissist.

I thought narcissism was about loving yourself.

And someone said there is a flip side to this.

So it's actually more distressing than self-love. It is unrequited self-love.

(laughs) I don't think it can happen again.

But I've been through so many different forms of comedy that I want to explain how I came to design my own particular brand of comedy.

I started improvising with a special form of improvisation called theater games. It has one rule, and I always thought it was a great rule for society's ethics.

And the rule was that you can't deny the other person's reality, you can only build on it.

And, of course, we live in a society that contradicts the reality of others.

It's all about contradiction, and I think that's why I'm so sensitive to contradictions in general.

I see you everywhere.

like a poll. I've always been interested in the 2 percent of Americans who don't know the answer to a given question in polls.

75% of Americans believe Alaska is part of Canada.

But only 2% are unaware of the impact of the Argentine catastrophe on IMF monetary policy -- (laughter) seems contradictory.

Or this ad I read in the New York Times: "Wearing a fine watch speaks volumes about your place in society.

Customers who buy from us have a reputation for good taste. ”

(Laughter) Or this is California Lawyer magazine, which I'm pretty sure I found in an article for Enron lawyers.

"Survive the Slammer: Dos and Don'ts"

(laughs) "Don't use pompous words."

(Laughter) "Let's learn common language."

(Laughter) Right. "Linga, Frankie."

(Laughter) And I think it's paradoxical to talk about science without knowing math.

Because—by the way, I am very grateful to Dean Carmen for pointing out that one of the reasons is cultural reasons why women and minorities don't get into science and technology—because, for example, the reason I don't do math is because I was taught to read at the same time I did math.

You are six years old and you are reading Snow White and the Seven Dwarfs. It soon becomes clear that there are only two kinds of men in the world. Dwarf and Prince Charming.

And your odds of finding the prince are 7 to 1.

(Laughter.) That's why little girls don't do math. I'm too depressing

(Laughter) Of course, by talking about science, I might provoke the wrath of some scientists who, like I did the other day, were very angry with me.

They used the word postmodern as if it was OK.

And they were very upset.

To his credit, I think one of them really just wanted me to have a serious discussion.

But I won't take it seriously.

Of course, the arguments are all contradictory and I do not approve of them because they are shaped by values ​​I question.

I question the values ​​of Newtonian science such as rationality. You must be reasonable in your arguments.

Well, rationality is built by what Christie Hefner was talking about today: the mind-body split.

The head is good, but the body is bad.

The head is the ego and the body is the id.

When we say 'I' we mean the head, as when Rene Descartes said 'I think, therefore I am'.

“I have no body,” as David Lee Roth sang on “Just a Gigolo.”

That's what makes it rational.

That is why there is so much humor about the body asserting itself against the head.

That's why we have toilet humor and sexual humor.

That's why the Raspini brothers punch Richard in the genitals.

And we're laughing doubly, because he's flesh, but it's also the voice behind the scenes: Richard.

Emily Levin: Richard. what did i say?

(laughs) Richard. Yes, but it's also responsible for meetings.

It's just another way of humor - like Art Buchwald shooting a head of state.

I don't think it's as lucrative as body humor (laughs), but still, why do we cherish and adore you?

But there are also contradictions in the rationality of this country. That is, while we respect the chief, he is also very anti-intellectual.

I know this because I read an article in the New York Times where the Ayn Rand Foundation ran a full-page ad after September 11th and said, "The problem is not Iraq or Iran. The problem facing this country is the professors and their descendants."

(Laughter) So I went back and re-read "The Fountainhead."

(laughs) I don't know how many people read it.

And I'm no expert on sadomasochism.

(Laughter.) But let's read a few random passages from page 217.

"The act of her master possessing her with painful contempt was the kind of rapture she desired.

When they lay together in bed it was inevitably a violent act by the nature of the act.

It was an act of gritting and hatred. It was intolerable.

Not caresses, but waves of pain.

Suffering as an act of passion. ”

So you can imagine my surprise when I read in The New Yorker that Federal Reserve Chairman Alan Greenspan claimed Ayn Rand as an intellectual leader.

(Laughter.) It's like finding out that your nanny is your mistress.

(Laughter) Unfortunately, I had to see J. Edgar Hoover in a dress.

Now we have to think of Alan Greenspan in a black leather corset with a tattoo on his butt that reads "Whip Inflation Now".

(Laughter) And Ayn Rand, of course, is famous for a philosophy called objectivism that reflects another value of Newtonian physics: objectivity.

Objectivity is basically built in the same S&M way.

The subject conquers the object.

That's how you assert yourself.

You make yourself an active voice.

And the target is the passive silent person.

I was very fascinated by the oxygen commercial.

I don't know if you know this, but maybe it's different now, or maybe you were making a statement, but according to Jessica Benjamin's book, in many hospital nurseries across the country, anyway, until recently, the sign above the boy's crib read "I'm a boy" and the sign above the girl's crib read "It's a girl." yes.

In other words, passivity was culturally projected onto the girls.

And this, I think we talked about last year, is still going on.

There's a poll to prove it -- one poll done by Time magazine asked only men, "Have you ever had sex with a woman you actively disliked?"

And yes.

Well, 58% said yes, but I think that's an exaggeration. Because just saying "Have you ever had sex..." "Yes!" is enough for so many men to answer.

They don't even wait for the rest.

(Laughter) And of course 2% didn't know I did -- (Laughter) This is the first quad callback I've tried.

(Laughter) This subject matter is part of what interests me so much. Because, frankly, this is why I believe in political correctness.

that's right. I think it can go too far.

I think the Ringling Brothers may have gone too far with an ad they ran in the New York Times Magazine.

“We have a lifelong emotional and financial commitment to our Asian elephant partners.”

(Laughter) Maybe I've gone too far. But I don't think it's the same thing for people of color to make fun of white people and for white people to make fun of people of color.

Alternatively, a woman teasing a man is the same as a man teasing a woman.

Or, just like the rich, the poor are making fun of the rich.

I think you can make fun of the haves, but you can't make fun of the have-nots. That's why I don't see myself making fun of Kenneth Lay and his charming wife.

(Laughter) What's wrong with only four houses?

(Laughter.) And I really learned this lesson during the Clinton Administration sex scandal, or what I call the good old days.

(Laughter) People I know, people who consider themselves liberals and everyone else, were making fun of Jennifer Flowers and Paula Jones.

Basically they were making fun of me saying it was trailer trash or white trash.

Perhaps it's a harmless prejudice and you don't really seem to hurt anyone.

Until you, like me, read an ad in the Los Angeles Times.

"For Sale: White Garbage Compactor"

(Laughter) So this whole subject and object thing has this humor and relevance.

I read a book by a woman named Amy Richlin, head of the classics department at USC.

And the book is called "The Garden of Priapus".

And she said Roman humor reflected the structure of Roman society.

So Roman society was, to some extent, very much like ours, up and down.

So was the humor.

There had to always be something to joke about.

So it was always satirists like Juvenal or Martial who represented the audience, and he ended up making fun of outsiders, those who did not share the position of the subject.

And of course, in standup, standup comedians are supposed to dominate the audience.

A lot of heckling is the strain of comedians trying to control themselves and see if they can beat the heckling.

And it got better during the standup.

But I always hated that because they dictate the terms of the dialogue, just as having a serious discussion determines the content of the story to some extent.

And I was looking for a form without that.

So I wanted something more interactive.

I know this term is very demeaning nowadays as it is used by internet marketers.

I really miss the old telemarketers now. I will tell you that.

(Laughter) Yes, because at least you have a chance. Look?

I was actually hanging up.

But I read in Dear Abbey that it was rude.

So the next time he called me, I let him go halfway through and said, 'That's sexy.

(laughs) He hung up!

(Laughter) But interactivity allows your audience to shape what you're going to do, just as you shape their experience of the world.

And that's really what I'm looking for.

And when I started analyzing exactly what I was doing, I read the book "Tricksters Make This World" by Lewis Hyde.

And it was like being psychoanalyzed.

So he made it all clear.

And coming to this conference, I realized that most people here share the same qualities. Because the trickster is actually an agent of change.

Trickster is a transformational agent.

And the traits I am about to describe are the traits that make change possible.

And one of them is crossing boundaries.

In fact, I think this infuriated the scientists.

But I like to cross boundaries.

Like I said, I like to talk about things I know nothing about.

(phone rings) I hope it's my agent, but you didn't pay me anything.

(Laughter) And I think it's good to talk about things you don't know, because it brings new perspectives.

I can see contradictions you can't see.

For example, once a pantomime, or as he called himself a meme.

He was such a selfish meme.

And he said it took me up to 18 years to learn how to pantomime properly and that I should show more respect.

And I said, "Then you'll know that only stupid people will participate in it."

(Laughter) It only takes two years to learn how to speak.

(Laughter.) (Applause.) And you know, this is a question of quoting, objectivity, and dequoting.

When you're surrounded only by people who speak the same vocabulary as you or who share the same assumptions as you, you start to think it's real.

Like economists, their definition of rationality is that we all act on our own economic selfishness.

Well, look at Michael Hawley, or look at Dean Kamen, or look at my grandmother.

My grandmother always acted for the benefit of others, whether people wanted it or not.

(laughter) If there was a Martyrdom Olympics, my grandmother would have lost on purpose.

(Laughter) "No, you will receive the prize.

young. i am an old man who sees

where are you going? I will die soon. ”

(Laughter) So that's one -- crossing this line, this intermediary -- Fritz Landing, his name actually said he was the intermediary.

That is exactly the quality of a trickster.

And the other is a non-competitive strategy.

And this is not a contradiction.

I think there is a paradox of coexistence of multiple realities in denying the other person's reality, and there is another philosophical structure.

I don't know what it's called.

But my example is a sign I saw at a jewelry store.

It read, "I'll get your ears pierced while you wait."

(Laughter) The alternatives are just wildly imaginative.

(Laughter) "Oh no. Thank you. But I'll leave it here. Thank you very much."

I have some errands to do. So, if you don't mind, I'll pick you up around 5:00.

teeth? teeth? what? i can't hear you. ”

(Laughter) And another attribute of Trickster is clever luck.

That accident, Louis Kahn, who talked about the accident, this is also the trickster's hallmark.

A trickster has a mind that is ready for the unprepared.

Also, I would like to point out to scientists that tricksters have the ability to hold onto their ideas lightly, giving them room to incorporate new ideas and spotting contradictions and hidden problems in their own ideas.

It was no joke.

I just wanted to put the scientists in their place.

(Laughter) But how I love to make a difference is to make connections.

This is what I tend to see rather than contradict.

What do you call something that looks like a gecko's leg?

As you know, gecko toes curl and curl like Michael Moshen's toes.

i love connection.

One of the two properties of matter in the Newtonian universe is read as the two properties of matter in the Newtonian universe. One is space occupation. Matter occupies space.

I think that the more important it is, the more space it takes up is the explanation for the whole SUV phenomenon.

(Laughter) And the other one is impenetrable.

Well, in ancient Rome, impenetrability was the standard of masculinity.

Masculinity depends on whether or not you are an active intruder.

And in economics, there are active producers and passive consumers, and this explains why businesses must constantly enter new markets.

Yes, what I want to say is why did you force China to open its market?

Didn't it feel good?

(Laughter.) And now we are being invaded.

You know that biotech companies have actually gotten inside of us and put a little flag in our genes.

We know we are being invaded.

And I suspect by someone actively hating us.

(Laughter) That's the second of the quadruples.

Yes of course I understand. thank you very much.

There is still a long way to go.

(Laughter) And when I make these connections, what I want is to short-circuit people's thinking.

Instead of following the normal associative flow, we need to restructure the wiring.

It's literally, when people talk about recognition shock, it's literally a re-recognition, a rewiring of the mindset. There was a joke that accompanied this, but I forgot it.

sorry. I'm becoming like the woman in that joke. Have you ever heard this joke about a woman driving with her mother?

And my mother is old.

And the mother ignores the red light and pushes forward.

And my daughter doesn't want to say anything.

She doesn't want to be told, "You're too old to drive."

And the mother goes through a second red light.

And the daughter, being as tactful as she could, said, "Mom, did you notice that we just passed two red lights?"

Then my mother said, "Oh! Am I driving?"

(Laughter.) And it's a cognitive shock within a cognitive shock.

This completes 4 rotations.

(Laughter) I just want to say two more things.

One, another feature of the Trickster is that the Trickster has to walk this fine line.

he must be calm.

And you know, the biggest hurdle for me is building performance so that I'm either ready or not ready for what I do.

Finding a balance between them is always dangerous because it can tip you in a direction you are not prepared for.

But over-preparation leaves no room for accidents.

Yesterday I was thinking about what Moshe Safdie said about beauty. Because Hyde says in his book that sometimes tricksters can be flipped over by beauty.

But for that you have to lose all other qualities. Because once you're obsessed with beauty, you're obsessed with the finished product.

You occupy space and are preoccupied with what exists in time.

It's a fact.

And it's always special to see something beautiful.

But instead, if we allow accidents to continue to happen, we may be on the same wavelength.

I like to think of what I do as a wave of probability.

Entering the world of beauty, the wave of probabilities collapses into a single possibility.

And I'm willing to explore all possibilities in the hope that you'll be on the viewer's wavelength.

And the last thing I want to say about Trickster is that he has no home.

he is always out

Richard, the last thing I want to say is that you made a home at TED.

And thank you for inviting me there.

thank you very much.

(applause)

i am an architect

And this photo shows my hometown, Beijing, China.

And old Beijing is like a very beautiful garden, you can see a lot of nature.

As a child, I learned to swim in this lake and climbed mountains every day after school.

But as we got older, we built more and more modern buildings.

And they all look the same.

They all look like matchboxes.

Why are modern buildings and cities full of these boxy shapes?

You can actually see two cities in this picture.

New York on the left and Tianjin, a Chinese city under construction on the right.

And they have very similar skylines.

They probably follow the same principle.

Compete for density, grab more space, and compete for efficiency.

Modern architecture therefore becomes a symbol of capital and power.

Chinese cities are building a lot of cities, but as you know, in addition to competing in this breadth and height, they have learned a lot from North American urban strategies, and they are repeating a lot from city to city.

So here we call it 1,000 cities with one face.

As a Chinese architect, I have to ask myself what I can do about it.

One day, as I was walking down the street, I saw people selling fish.

And they put fish in this cubic tank.

So I was asking the same question, why is there cubic space for fish?

Do they like three-dimensional spaces?

(Laughter) Obviously not.

So maybe cubic space, cubic architecture is cheaper and easier to make.

So I did a little research and set up cameras to try and observe how the fish behaved in this cubic space.

And it turns out they probably aren't happy.

This cubic space wasn't the perfect home for them, so I decided to design a new aquarium for them.

I think it should be more organic, more fluid space inside.

A more complex interior.

I'm sure they would be happier living in this space, but I don't know because they don't talk to me.

(Laughter) But a year later, we had the opportunity to design this real building for humans.

This is actually a pair of towers we built in Mississauga, a city outside of Toronto.

And people call it the Marilyn Monroe Tower -- (laughter) because of its curvature.

And the idea was to build a tower, a tall residential tower, but not a box.

I take more inspiration from nature, such as the sun's rays and the dynamics of the wind.

After we finished designing the first tower, they said to us, "You don't have to design the second tower. Just repeat the same design, and you'll pay twice."

But I said, "You can't have two Marilyn Monroes up there."

And nature never repeats itself, so now we have two buildings that can dance together.

So I have this question for myself.

You know, in modern cities, why do we often think of architecture as a machine, a box?

So here, I would like to see how people in the past viewed nature.

Upon examining this traditional Chinese painting, I found that it mixes the natural and the artificial in a very dramatic way to create such an emotional landscape.

So, in modern cities, my question is, is there a way to combine buildings and nature instead of separating them?

So we have another project that we built in China.

It's a fairly large apartment complex.

And it is located in a very beautiful natural environment.

Honestly, it was too beautiful when I first visited.

And I almost decided to reject the project because it felt like a criminal to do anything there.

I don't want to be a criminal.

But my next thought was that if I didn't, I'd just build a standard city tower there anyway.

That would be a shame.

So I decided I had to give it a try.

So we took contour lines from existing mountains and converted those lines into buildings.

So these towers actually incorporate natural forms and geometries.

Therefore, each building has a different shape, different size and different height.

And they become an extension of nature in which they are located.

You might think that I sometimes use a computer to design this kind of architecture, but I actually use hand sketches a lot. Because I like the randomness of hand drawn sketches.

And it can convey emotions that a computer can't express.

In this photo, architecture, humans and nature coexist and maintain a good relationship.

This man in the picture is actually one of the architects on our team.

I think he's enjoying the beautiful natural scenery and is relieved that he's not one of the criminals - after all (laughs).

Coming back to cities, in Beijing I was commissioned to design these city towers.

And I made this model.

This is an architectural model, which looks like small mountains and small valleys.

I put this model on the table and watered it every day.

A few years later, the building was completed.

You can see how my hand drawn sketches are reflected in the real building.

And they are very similar.

It looks like a black mountain.

And this building is located like this in the city.

Right on the edge of this beautiful park.

It is very different from the surrounding buildings as other buildings are trying to build a wall around nature.

But what we are trying to do here is make the building itself part of nature, and extend nature from the park to the city.

That was the idea.

A Chinese art critic painted this painting.

He included our building in this painting.

Can you see those little black mountains?

It seems to fit this picture very well.

However, in this reality, our designs are challenged to look very different from their surroundings.

And they asked me to change the design either in color or shape so that the building would better fit the situation.

So my question was why this traditional natural context fits better than reality.

Maybe there is something wrong with reality.

Your context is wrong.

In the northernmost part of China, we also built this opera house.

It's the Opera House next to the river in Wetland Park.

So we decided to make the building a part of the surrounding landscape and blend into the horizon.

The building looks like a snowy mountain.

People can walk on buildings.

During the day and on days when there is no opera, people can come here to enjoy the scenery and continue their journey from the park to the building.

When you reach the roof, there is an amphitheater that surrounds the sky, where you can sing to the sky.

The opera house has a lobby with plenty of natural light, and you can enjoy the semi-indoor and outdoor spaces and enjoy the beautiful scenery of the surroundings.

I've built several mountains, but here's one building that I think looks like a cloud.

The Lucas Narrative Arts Museum is under construction in Los Angeles.

This museum was created by George Lucas, the creator of the movie "Star Wars".

Why do some buildings look like clouds?

Because I think clouds are mysterious and I imagine them.

it's natural.

When this natural element lands in the city, it's surreal.

And that intrigues me and makes me want to explore.

Thus the building landed on Earth.

Lifting and floating this museum on the ground frees up a lot of scenery and space underneath the building.

And at the same time, you can create a roof garden on top of the building and visit it to enjoy the view.

The museum is scheduled to be completed in 2022 and we invite you to visit it when it is completed.

So after building all these mountains and clouds, now we are building these volcanoes in China.

It's actually a huge sports park with four stadiums and one 40,000-seat football stadium.

So it's a very large project.

And looking at this picture, it's almost impossible to tell where the buildings are and where the scenery is.

In other words, the building becomes a landscape.

It has also become a land art, people can walk around the building and climb this building while wandering around this volcano park.

And this rendering shows one of those volcanic spaces.

Actually, this is a pool where natural light pours from above.

So what we are really trying to create is an environment that blurs the boundary between architecture and nature.

In other words, architecture is no longer a functional machine for life.

It also reflects the nature around us.

It is also a reflection of our soul and spirit.

So, as architects, I don't think we should repeat such soulless matchboxes in the future.

I think what I'm looking for is an opportunity to create a future where humans and nature are in harmony.

thank you very much.

(applause)

I wanted to talk to you today about two things. One is the rise of a culture of availability. And the second is the request.

Therefore, we can see that the proliferation of mobile devices has increased this availability across all social strata around the world.

As mobile devices proliferate, so do expectations of availability.

And with that comes the obligatory third point. This is an obligation to its availability.

And the problem is that we are still working out from a social point of view how to enable people to respond.

In fact, there is a big gap between what we accept.

Apologies to Hans Rosling, he said anything that doesn't use real statistics is a lie. But the big difference is how they deal with this from a public standpoint.

So we have developed specific tactics and strategies for concealment.

This first one is called "lean".

And if you've ever been in a meeting where you're playing some sort of meeting "chicken," you're probably sitting there staring at the other person, waiting for them to look away, then checking your device right away.

You can see the gentleman on the right crushing him.

"Stretch."

OK, the gentleman on the left says, "Damn, I'm going to check your device."

But the man on the right here is stretching.

It's Lee E E E E E E E E E E E E E E E E Einging out physical twist to place that device right under the tabletop.

Or my favorite, "Love you; means it."

(Laughter) There's no better way to say "I love you" than "Let me find someone else to care about."

Alternatively, this is coming to us from India.

You can watch this on YouTube. A gentleman texting while riding a motorcycle.

Or the so-called "sweet gravy, stop before I kill you again!"

It's actually that device.

What this does is, we find -- (laughter) a direct conflict -- between availability and what availability enables -- and a basic human need -- what we often hear, in fact -- the need to create shared narratives.

We are good at creating personal stories, but it is the shared stories that make us a culture.

And when you're standing with someone and using your mobile device, what you're telling them is effectively, "You are literally less important than almost everything that reaches me through this device."

look around you.

Someone may be participating in a multidimensional engagement now.

(Laughter) Our present reality is not as interesting as the story we are going to tell later.

this is what i love.

This poor child is clearly a prop - don't get me wrong, it's a prop willingly - but the kisses documented look kind of awful.

It's a clapping sound.

So, as we lose the context of our identity, it becomes so important that what you share becomes the context of the shared story, the context in which we live.

The stories we tell, the stories we push, become who we are.

People create identities, not just project them.

That is my request to everyone in this room.

We create technologies that create new shared experiences and create new worlds.

So my request is not to make people human, but make technology that makes them human.

thank you.

Winter is almost over, but when I wake up, the house is cold. This is strange as we left the heater on all night.

you turn on the light

not moving

In fact, neither the coffee maker nor the TV are working.

Life outside seems to have stopped.

There are no schools, most businesses are closed, and there are no trains.

This is not the opening scene of a zombie apocalypse movie.

This is what happened in Quebec, Canada in March 1989 when the power grid went out.

Who is the culprit?

Sun Lam.

Solar storms are giant clouds of particles that are sometimes ejected from the Sun, a constant reminder that we live near active stars.

And as a solar physicist, I have a great opportunity to study these solar storms.

But "solar storm Chaser" isn't just a cool title.

My research aims to help understand where they come from, how they behave, and, in the long run, reduce their impact on human society. More on this later.

At the dawn of the age of space exploration just 50 years ago, the probes we sent into space revealed that the planets of our solar system are constantly bathed in a stream of particles from the Sun that we call the solar wind.

And just as the global wind pattern on Earth is affected by hurricanes, the solar wind can also be affected by solar storms, which I like to call "cosmic hurricanes."

When they arrive on a planet, they can disrupt the space environment, resulting in aurorae and southern lights, for example, not only here on Earth, but also on Saturn and Jupiter.

Fortunately, here on Earth, we are protected by Earth's natural shield, a magnetic bubble called the magnetosphere, visible to the right.

Nevertheless, solar storms can still disrupt satellite communications and operations, disrupt navigation systems such as GPS, and power transmission.

These are all technologies that we humans rely on more and more.

I mean, imagine if you woke up tomorrow and your phone wasn't working. It means that your mobile phone is not connected to the internet, which means it is not connected to social media.

I mean, to me it would be worse than the zombie apocalypse.

(Laughter) But by watching the sun all the time, we knew where the solar storms were coming from.

They come from regions of the Sun where vast amounts of energy are stored.

Here is an example of a complex structure hanging over the surface of the Sun just before an eruption.

Unfortunately, we can't send the rover into the sun's scorching atmosphere, where temperatures can rise to about 10 million Kelvin.

So what I'm doing is using computer simulations to predict, not just analyze, how storms behave when they're in their infancy on the Sun.

However, this is only part of the story.

As these solar storms travel through space, some of them will inevitably encounter space probes that we humans have sent to explore other worlds.

Other worlds refer not only to planets such as Venus and Mercury, but also to celestial bodies such as comets.

These spacecraft are built for a variety of scientific endeavours, but they can also act like small space weather stations and monitor the evolution of space storms.

So I'm working with a group of researchers to collect and analyze this data from different parts of the solar system.

In doing so, my research shows that solar storms actually have a general shape, and this shape evolves as they move away from the Sun.

And what do you know?

This is key to building tools to predict space weather.

I would like to leave this beautiful figure for everyone.

This is us on Earth, this pale blue dot.

And as I study the Sun and its storms every day, I will always have a deep affection for this beautiful planet. A pale blue dot indeed, but a pale blue dot with an invisible magnetic shield that protects us.

thank you.

(applause)

So how can we run an entire country without oil?

That's the question that came to me in the middle of the afternoon at the Davos meeting about four years ago.

It stuck in my head.

And I started playing it like a puzzle.

My first thought was that this must be ethanol.

So I did some research on ethanol and found that every country needs an Amazon in their backyard.

We thought it must be hydrogen until about six months later, a scientist told us the unfortunate truth. That said, with hydrogen, you're actually using more clean electrons than you get in your car.

So it's not the way to go.

As I was walking around, I came to the idea that if we could convert the entire country to electric vehicles in a convenient and affordable way, maybe we could have a solution.

Now, I started from the perspective that this has to be massively scalable.

Rather than how to build one car, how can we make it available to 99% of the population?

What came to mind was that it should be as good as any car you own today.

In other words, it should be more convenient than a car.

And two, it's more affordable than current cars.

Affordability isn't a $40,000 sedan, right?

are you OK? It's not something we can finance or buy today.

And convenience is not like driving for an hour and charging 8 times.

Therefore, we are bound by the laws of physics and economics.

So my first thought was, within the science as we know it today, how do we do this? No time for science fairs, no time to tinker and wait for the magic battery to appear.

How do we do that in today's economics?

How do we do that from the power of the consumer?

It is not by force of decree.

During a random visit to Tesla one afternoon, I learned that, in fact, the answer comes from distinguishing between car ownership and battery ownership.

Come to think of it, this is, in some ways, the quintessential "batteries not included."

Distinguishing the two is that by actually creating a network, you can serve the needs of a useful car by creating a network before the car appears.

The network has two components.

The first element is charging the car at every stop. In the end, the car turns out to be a strange beast that drives for about 2 hours and parks for about 22 hours.

If you drive the car in the morning and then drive it again in the afternoon, the charge to drive time ratio is about 1 minute.

So the first thing that popped into my head was that there was power no matter where I parked.

Sounds crazy now. But some places around the world, such as Scandinavia, are already doing it.

If you didn't turn on the heater when you parked your car, when you come back your car won't be there. It doesn't work.

Now, the last mile, the last foot, in a sense, is the first step in infrastructure.

The second step in the infrastructure should handle the range extension.

We're stuck with today's battery technology, and if we want to stay within reasonable space and weight limits, the range will be about 190 miles.

120 miles is plenty of range for most people.

But you never want a dead end.

So what we added to the network was the second element, the battery exchange system.

you drive. Remove the depleted battery.

Lights up when the battery is fully charged. and you keep driving.

It's something you shouldn't do as a human being. You do it as a machine.

It's like a car wash. You enter the car wash.

And then a plate appears to hold the battery, take it out and put it back in, and in less than two minutes you're back on the road and ready to go again.

If there were charging spots everywhere and battery swapping stations everywhere, how often would you charge your car?

I actually added a contract.

I said that if I stop changing batteries more than 50 times a year, I will start paying for it because it is inconvenient.

Next, we considered the issue of affordability.

We considered the question of what happens when the battery is disconnected from the car.

What is the price of that battery?

Everyone says batteries are very expensive.

What we discovered is that when we go from molecules to electrons, something interesting happens.

You can go back to the original economics of the car and revisit it.

In a way, batteries are not gas tanks.

Remember that your car has a gas tank.

you have crude oil

The crude oil is then refined and delivered as so-called gasoline.

A battery in this sense is crude oil.

It has a battery bay. It costs the same hundreds of dollars as a gas tank.

But crude oil will be replaced by batteries.

It just doesn't burn. It consumes itself one after another.

There are now 2,000 lifecycles.

So it's kind of a mini-well.

In the past, when I bought an electric car, I was asked to pay for the entire well, or for the life of the car.

No one wants to buy a mini well when they buy a car.

In a way, what we did was create a new consumable.

Today you buy gas miles.

And so we created Electric Mile.

And the price of electricity miles will be a very interesting number.

Today in 2010, the amount on the market is 8 cents per mile.

For those who have difficulty calculating what that means in the average US consumer environment,

20 miles per gallon, or $50,60 per gallon.

This is cheaper than current gasoline in the United States.

In Europe, where taxes are in place, this equates to minus $60 a barrel.

But electronic miles follow Moore's Law.

8 cents per mile in 2010, 4 cents per mile in 2015, and 2 cents per mile by 2020.

why? Battery life cycle is improved, resulting in slightly higher energy density and lower price.

And those prices are really the prices with clean electrons.

No electrons generated from coal are used.

So, in a way, this means we can get absolutely carbon-free, fossil-fuel-free electric miles at 2 cents per mile by 2020.

Even if we reach 40 miles per gallon by 2020, that's our aspiration.

Imagine a car driving down the road that only gets 40 miles per gallon.

That's 80 cents a gallon.

80 cents a gallon means that even if the entire Pacific turned into crude oil and had the oil companies take it out and refine it, 2 cents a mile would still not be a match.

This is the new economic factor, which appeals to most people.

This would have been a great thesis.

That's how I solved it in my head. It was a white paper that I distributed to the government.

And some governments have told me it's interesting that younger generations are actually thinking about these things.

(Laughter.) He manipulated me brilliantly until we got to the real young world leader, Israeli President Shimon Peres.

First he let me go to the Prime Minister of that country. The prime minister said that if he could find the funding needed for this network, $200 million, and a car company that would mass-produce two million of those cars, that's what Israel needed. I said, give me a country to invest that $200 million.

Perez thought it was a great idea.

So we went out and looked at all the car companies.

We have sent letters to all car companies.

Three of them never showed up. One of them asked me if I could get a discount if I kept the hybrid car.

But one of them, Renault and Nissan CEO Carlos Ghosn, said something very interesting when asked about hybrids.

He said hybrids are like mermaids.

When you want a fish you get a woman, when you need a woman you get a fish.

(Laughter.) Then Ghosn came and said, "I have a car, Mr. Perez. I will build your car."

And indeed, staying true to its form, Renault spent $1.5 billion building nine different types of cars to fit this kind of mass-market model -- 100,000 in the first year of mass production.

This is the first mass-produced electric vehicle on the market, a zero-emission electric vehicle.

As Chris said, I was running for CEO of a big software company called SAP. Perez said. "Could you run this project for me?"

And I said, 'I'm ready to be CEO.'

So I had to quit and come get a job called "A Better Place."

After that, we decided to scale up.

we went to another country. As I said earlier, we went to Denmark.

And Denmark has instituted this wonderful policy. It's called an IQ test.

Inversely proportional to tax.

180 percent tax on gasoline vehicles and zero tax on zero-emission vehicles.

This means that buying a petrol car in Denmark will cost around €60,000.

About 20,000 euros to buy our car.

If you fail the IQ test, you will be asked to leave the country.

(Laughter.) After that, we were kind of created as people who only performed on small islands.

I know most people don't think of Israel as a small island, but Israel is an island, a transit island.

If your vehicle is being driven outside Israel, it has been stolen.

(Laughter) In terms of islands, we decided to go to the biggest island we could find. That was Australia. The third country to announce was Australia.

It has three centers in Brisbane, Melbourne and Sydney, with one motorway and one electric driveway connecting them.

Finding the next island wasn't too difficult. It was Hawaii.

We decided to enter the United States.

Then pick the two best locations, i.e. the two that don't need range extension.

Hawaii can run around the island with one battery.

If you want a really long day, you can flip the switch and continue driving around the island.

The second is the San Francisco Bay Area, where Gavin Newsom has a beautiful policy that spans all mayors.

He decided to informally and officially take over the state and created this beautiful Region 1 policy.

The San Francisco Bay Area not only has the highest concentration of Prius, but also the perfect range extenders.

It's called another car.

As we expanded on it, we looked at what the problems would be for the United States.

Why is this a big deal?

And the most interesting things we learn are when small problems arise on a personal level, such as the price of gas to drive each morning.

You don't realize it, but you are dead when the collective appears. are you OK?

Thus, the price of oil follows a depletion curve, like many others we have seen.

The basis of this curve is that we continue to lose wells close to the ground.

And we keep getting wells farther from the ground.

Digging them out is getting more and more expensive.

You think it will go up and down and up and down.

Here is the problem. Six months ago, at $147 a barrel, the United States spent a lot of money to get oil.

Then the economy went down and it went down to 47. Sometimes it's 40, sometimes it's 50.

Now we are doing economic stimulus.

It's called the $1 trillion stimulus package.

We will revitalize the economy. I hope it happens somewhere in that space between now and 2015.

What will happen when the economy recovers?

At the current pace, at least 250 million new cars should be produced by 2015.

This translates into an additional 30% increase in oil demand.

That's another 25 million barrels per day.

This is the only US usage today.

In other words, it peaks at some point in recovery.

And run the OPEC stimulus, also known as $200 a barrel.

We take money and donate it.

Do you know what happens at that point?

back down. It goes up and down.

And the descent is much longer and the ascent much shorter.

That's the difference between an additive problem, like carbon dioxide, that slowly rises and then tilts, and an exhaustive problem that loses what it has, vibrates, and vibrates until it loses everything it has.

Let's see the answer in action.

right? Campaign Recall: 1 million hybrid cars by 2015.

This is equivalent to 0.5% of US oil consumption.

That's a decent percentage of the rest of the world.

It doesn't make much of a difference.

We looked at the MIT study, the 10 million electric cars on the roads around the world.

10 million out of 500 million will be added in the near future.

This is the most pessimistic number.

This is also the most optimistic number. Because it means the industry will expand from 100,000 units in 2011 to 10 million units by 2016. That's a 100x growth in less than five years.

It should be remembered that there are so many cars in the world today.

Each region has 10 million cars.

That's a huge amount of cars.

China is adding cars from India, Russia, Brazil and others.

We have all these regions.

Europe has solved it. They just taxed gasoline.

Because of the high prices, they will be the first in line to get off.

China solves it by edict. At some point they just declare that petrol cars are not allowed into the city and that's it.

Indians don't even understand why we care about 2-3 gallons of fuel every time most people in India fill up.

For them, getting a 120-mile battery means more range, not less range.

We are the only ones not priced correctly.

We haven't set the industry right.

We have no incentive to go all over the country to solve this problem.

So what's going on with the auto industry?

Very interesting. The auto industry has focused only on itself.

They basically looked at it and said, "With Car 1.0, everything is solved within the car itself."

No infrastructure? No problem.

We forgot about the whole chain around us.

All these things happening around.

We are looking at the emergence of a whole new market, a whole new business model: Car 2.0.

In this business model, the money that actually comes in to drive the car, which you know well, in minutes and miles, subsidizes the price of the car, just like a mobile phone. You pay for the miles.

And part of that goes back to automakers.

Some of it will go back to your pocket.

But our car will actually be cheaper than a gas car.

What you see is a world where cars and windmills go hand in hand.

In Denmark, all cars in the country are powered by windmills instead of oil.

Israel is calling for solar power plants to be installed in southern Israel.

And people said, "Oh, you want a lot of space."

And we said, "What if we could prove that in the same space we'll find oil for the country for the next 100 years?"

And they said, "I tried, but nothing happened."

We said, "No, but what if we prove it?"

Then they said, "Well, you can dig." And we decided not to dig, but to dig.

They match each other perfectly.

Now we only need about 10 percent of the electricity generated.

Think of it as a project that spans about ten years.

That's 1 percent per year.

Now, when trying to solve big problems, we need to start thinking in terms of two numbers.

And they won't reach 20 percent by 2020.

Two numbers are zero (such as zero footprint and zero oil) and their scale is infinite.

And when we go to COP15 at the end of this year, we can't help but think about inflating CO2.

We have to start thinking about giving a kicker to countries willing to undertake such a scale.

One car emits 4 tons of exhaust gases.

And in fact, between 700 and 1 million cars now emit 2.8 billion tons of CO2.

This adds up to about 25 percent of the problem.

Cars and trucks account for up to about 25% of global CO2 emissions.

We must focus on this issue and try to get the world to zero before it ends.

I actually shared that with some members of Congress here in the United States.

I shared it with one of my idols, a gentleman named Bobby Kennedy Jr.

I told him that one of the reasons his uncle was remembered was because he said he was going to send mankind to the moon and would achieve it by the end of the decade.

We're not saying we're going to send 20 percent of humans to the moon.

And we have about a 20% chance of getting him back.

(Laughter) He actually told me a different story. That's about 200 years ago.

Two hundred years ago, there was a lengthy debate in the British parliament over economics and morality.

25% accounts for 25% of the energy of UK industry overall, just as 25% of today's emissions come from cars.

It came from an immoral source of energy - human slaves.

And we got into an argument. Should we stop using slaves?

And what will it bring to our economy?

And people said, 'Well, it's going to take time to do that.

Stop it now. Perhaps free the children and keep the slaves.

And after a month of discussion they decided to abolish slavery and less than a year later the Industrial Revolution began.

And Britain continued economic growth for 100 years.

We have to make the right moral decisions.

I have to make it soon.

We need presidential leadership, just like Israel, who said it would phase out oil.

And we need to do it within this president's term, not within 20 or 50 years. Otherwise, you will lose your economy immediately after you lose your morality.

Everyone Thank you very much.

(applause)

The year is 1776.

In Bavaria, the new ideals of rationalism, religious freedom and universal human rights competed with the Catholic Church's great influence over public affairs.

Across the Atlantic, new nations have staked their claim to independence on these ideas.

Back in Bavaria, however, attempts by law professor Adam Weishaupt to teach secular philosophy continued to fail.

Weishaupt decided to spread his ideas through secret societies that shed light on the shortcomings of the church's ideology.

He called his secret society the Illuminati.

Weishaupt modeled his secret society aspects from a group called the Freemasons.

Originally an elite masonry guild of the late Middle Ages, Freemasonry went from inheriting the art of masonry to promoting the ideals of knowledge and reason more generally.

Over time, they grew into a semi-secret, monopoly cult that included many wealthy and influential individuals, with elaborate secret initiation rites.

Weishaupt joined Freemasonry and founded a parallel society, recruiting from that rank.

He adopted the codename "Spartacus" for himself, after the famous leader of the Roman slave rebellion.

Early members became the Illuminati's ruling council, or Areopagus.

One of these members, Baron Adolf Knigge, was also a Freemason and became a powerful recruiter.

With Knigge's help, the Illuminati expanded their numbers, gained influence within several Masonic branches, and adopted Masonic rituals.

By 1784, it had over 600 members, including influential scholars and politicians.

As the Illuminati increased its membership, so did the American Revolution.

Thomas Jefferson would later cite Weishaupt as an inspiration.

European monarchs and clerics feared a similar uprising in their homelands.

Meanwhile, the existence of the Illuminati was an open secret.

Both the Illuminati and Freemasonry were funded exclusively by the wealthy elite of society, which meant that they were always on par with members of the religious and political establishment.

Many in the government and church believed that both groups were determined to undermine people's religious beliefs.

But these groups were not necessarily against religion, they just believed that religion should be separated from government.

Still, the skeptical Bavarian government began keeping records of alleged Illuminati members.

When Illuminati members began to secure important positions in local governments and universities, the decree of Duke Karl Theodor of Bavaria in 1784 outlawed all secret societies.

Publicly banning something that is ostensibly secret may seem hard to enforce, but in this case it worked.

Just nine years after its founding, the group disbanded, their records confiscated, and Weishaupt forced into exile.

The Illuminati will be even more notorious in the afterlife than their brief existence.

A decade later, in the aftermath of the French Revolution, conservative writers claimed that the Illuminati had survived expulsion and plotted to overthrow the monarchy.

In the United States, preacher Jedidiah Morse promoted similar ideas about an Illuminati conspiracy against the government.

However, while the idea of ​​a secret group orchestrating political upheaval is still alive and well today, there is no evidence that the Illuminati survived, reformed, or went underground.

Their brief tenure was well documented in the records of the Bavarian government, in the records of the still active Freemasons, especially in the overlap of these two sources, and was never whispered afterwards.

It must be concluded that the Illuminati no longer exist, according to the spirit of rationalism they have accepted.

However, the ideas that inspired Weishaupt to found the Illuminati are still widespread and are the basis of many Western governments today.

These ideas started with the Illuminati and did not end with the Illuminati. Instead, the Illuminati was one community representing a wave of change that was already underway at its founding and that continued long after the Illuminati ended.

So I have a background in technology and magic.

And magicians are fun too.

Their fantasies do things that technology can't.

But what happens when today's technology seems like magic?

What would happen if we could do this?

(music) Well, 100 years ago it would have been the magic of levitation.

Is it possible to create illusions in a world where technology makes everything possible?

Jump!

Now, where's the illusion if you know how the trick is done?

But still, our imagination is stronger than reasoning, and it's easy to blame machines for personality.

These are quadcopters.

But they are more than just mechanical flying machines.

They analyze their environment and react to everything I do.

Algorithms allow these autonomous machines to quickly fly in close formation, recognize each other, and recognize me. Mathematics can be mistaken for intelligence, and intelligence for personality.

Anthropomorphism: It is an illusion, an illusion created by technology and embroidered by our imagination to become an intelligent flying robot, a machine that appears to be alive.

(Music plays "Close Encounters of the Third Kind") (Quadcopter makes noise) I think it says "Hello".

Hey, guys! come.

and time to land.

that's all.

thank you.

(Applause) Okay, everyone, let's go home.

everybody's here

Come on, everyone, hurry up.

It doesn't need to be pressed and fits anyone.

Here, a little to the left, a little to the right.

Come on guys, guys, and... congratulations!

(Cheers) Thank you.

(Applause.) Thank you.

(applause)

A future of life that unlocks our biology and sheds a little light. No slides.

I just want to talk - about where it could take us.

And you know, I saw all the visions in the first few sessions.

I almost felt a little guilty about talking brightly about the future.

In a way it felt wrong to do that.

Still, I don't think it's true. After all, it's this grand trail that really sticks, and future generations will remember this era.

I want to talk a little bit about what the vision of Jeremy Rivekins, who wants to ban this kind of technology, and Mr. and Mrs. Bill Joy, who want to abandon them, actually looks like. It would be very tragic for us to follow such a path.

I focus on biology, biological sciences.

The reason I do that is because they will be the most important areas for us.

The reason is actually very simple.

Because we are human beings.

we are biological creatures.

And what we can do biologically will shape us, our children, and their future. Whether we can control aging, learn how to protect ourselves from Alzheimer's disease, heart disease and cancer.

I think Shakespeare did it really well.

And I'm actually going to use his words in the same order as his.

(Laughter) He said, "And we are ripening by the minute.

And with each passing hour, we rot.

And that creates a story. ”

Life is short, isn't it?

And then you have to think a little bit about the plan.

All of us, even in developed countries, will eventually lose everything we love.

When you're starting to rot a little, all the videos stuffed into your head, all the extensions that extend your various powers, will seem a little secondary.

And you know, I'm getting a little gray. So does Ray Kurzweil, so does Eric Drexler.

This is truly the center of our lives.

Now I know there is a lot of hype about our power to control biology.

You might want to look at the Human Genome Project.

It wasn't two years ago that everyone said they had found the holy grail of biology.

We are deciphering the code of the cipher.

we are reading the book of life

It reminds me a bit of 1969 when Neil Armstrong walked on the moon and everyone was trying to race to the stars.

And we've all seen 2001: A Space Odyssey.

It's 2003 now and there is no HAL.

And there is no journey to our own moons, much less to the moons of Jupiter.

And we're still picking up pieces of the Challenger.

So it's no wonder that, perhaps 30 or 40 years from now, we'll be looking back at this moment and wondering all the talk about the Human Genome Project and what it means to us. Well, it really makes little sense.

And I want to say that absolutely not.

Because when we talk about our genetics and biology and modifying, altering and adjusting these things, we are talking about changing ourselves.

And this is very important.

If you have any questions about how technology will affect our lives, just go to the major cities.

This is not the stepping stone of our Pleistocene ancestors.

What's happening is that we're taking this technology, becoming more accurate, more powerful, and taking it back into ourselves.

Before it's all over, we're going to change ourselves, little by little, as much as we've changed the world around us.

It will happen much sooner than people imagine.

On the way there will be a complete revolution in medicine and healthcare. It's clear.

It will change the way we raise our children.

It will change the way we manage and change our emotions.

Human lifespans will probably change as well.

It really asks us what it means to be human.

The larger context of this is two unprecedented revolutions underway today.

The first is the obvious silicon revolution. Everyone knows this.

It has changed our lives in so many ways, and it will continue to do so.

The essence is that we take the sand under our feet, the inert silicon under our feet, and imbue it with a level of complexity that rivals or exceeds life itself.

As an extension of that, the offspring of that revolution, is the revolution in biology.

The genomics revolution, proteomics, metabolomics, all these "omics" sound pretty great in grants and business plans.

What we are doing is controlling our evolutionary future.

So we're basically using technology to fast-forward evolution.

It's not quite clear where that will take us.

But five to ten years from now, we're going to see very big changes.

The most direct change we see is in things like healthcare.

A major shift in preventive medicine will occur as we learn to identify all of the risk factors we have as individuals.

But who will pay for all this?

And how do we make sense of this complex information?

The next-generation IT challenge is communicating all this information.

There is pharmacogenomics, which is the combination of pharmacology and genetics. This is about tailoring the medicine to our individual constitution, which Juan talked about a while ago.

It will have an amazing impact.

It will also be used in diets and nutritional supplements.

But as niche drugs emerge, they will have a big impact.

And we can't support the costs required to develop a blockbuster drug today.

In fact, the approval process would collapse.

Too late.

Too much risk aversion.

And it doesn't really fit the future we're heading towards.

The other is that we have to deal with this knowledge.

It's really cool when you say, "Oh, 99.9 percent of the characters in the code are the same."

We are all like each other. Isn't it great? ”

And look around and know that it's that little bit of difference that we really care about.

We may look alike to visitors from other planets, but we are not so to each other because we are always in competition.

And we will need to understand the fact that there are differences between us as individuals and also between human subgroups that we will come to know.

Denying that it's the case isn't a very good start to it.

A generation or so down the road, something even more serious will happen.

Then we begin to use this knowledge to transform ourselves.

I'm not talking about extra gills here. It's something we care about, like aging.

What if we could unravel and understand aging and slow it down or even vice versa?

It will completely change everything.

And if you can do this, it's clear to everyone that you will absolutely do it, whatever the consequences.

The second is to change your emotions.

Ritalin, Viagra and the like, Prozac.

You see, this is just a clumsy little step.

What if you could take a little concoction that made you feel really good about yourself and just happy to be you?

If there are no obvious side effects, can I resist it?

Probably not.

If not, who would you be?

why would you do something like that?

We seem to be circumventing the evolutionary programs that guide our behavior.

It will be very difficult to deal with it.

The third area is regeneration.

The idea that as we begin to understand what our genes tell us about what it means to be human, we will be choosing our genes for our children.

That's the focus of my book Redesigning Humans, which talks about the choices we make and the challenges they pose for society.

There are three obvious ways to do this.

The first is cloning.

That didn't happen.

It's a complete media circus.

It will happen within 5 to 10 years.

And even if it did, it wouldn't be much of a problem.

Western civilization will not be shaken by the late birth of identical twins.

But something more important has already happened: embryo screening.

A 6- to 8-cell stage embryo is taken, one of the cells is removed, genetic testing is performed on that cell, and depending on the results of the test, the embryo is either transferred or discarded.

Now it is already done to avoid rare diseases.

And soon we will be able to avoid virtually all genetic diseases this way.

Once that is possible, this will shift from being used by people with infertility problems who are already doing IVF, to being used by the wealthy who want to protect their children, and just about anyone else.

In the process, it changes from simply targeting diseases to targeting lesser vulnerabilities such as the risk of manic-depressive illness, to selecting personality, temperament, traits, etc.

Of course there will be genetic modification.

It invades directly, some distance, but not too far, and modifies genes in the first cells of the embryo.

The way I suspect it might happen is with artificial chromosomes and additional chromosomes. That is, go from 46 to 47 or 48.

And it's not hereditary. Because who would want their children to inherit the old reinforcement modules they received from their parents 25 years ago?

It's a joke; of course they don't want to do that.

They will want a new product.

(Laughter) These loose analogies with computers and programming are actually much deeper than that.

They will really become active in this area.

You shouldn't do everything you can right now.

and it won't run.

But when something is feasible in thousands of laboratories around the world (as will be the case with these technologies), when there are large numbers of people who think it will be useful (already), and when it is nearly impossible to police them, the question is not whether this will happen, but when, where and how.

Humanity will follow this path.

And it intends to do so for two reasons.

First, all of these technologies are just offshoots of mainstream medical research that everyone hopes will happen.

A very large amount of funding is provided.

Second, we are human.

that's what we do.

We strive to use technology to improve our lives in some way.

Imagining that we will not use these technologies when they become available is as much a denial of who we are as imagining that we would use them without much concern.

The lines become blurry. And they are already between cure and enhancement, between cure and prevention, between need and desire.

I think that's really central.

People can try to ban these things.

they definitely will. they have.

But in the end it just moves development elsewhere.

It will keep these things out of sight.

We intend to reserve this technology for the wealthy, as they are best positioned to circumvent this type of law.

And it denies us the information we need to make smart decisions about how we use these technologies.

So, certainly we need to discuss these things.

And I think it's great that we do.

But we shouldn't joke and think we'll come to an agreement on these things.

That will never happen.

They touch us too deeply.

And they rely too much on history, philosophy, religion, culture and politics.

Some may see this as an abomination, a bad thing, a terrible thing.

Others will say, "This is amazing."

This is the flowering of human effort. ”

However, the real danger with this kind of technology is that it can easily be tempted.

And too much focus on all the high-tech possibilities that exist.

And we lose the basic rhythm of our biology and health.

Too many people think that high-tech medicine will protect them and save them from overeating, eating too much fast food, and not exercising enough.

It won't happen.

It's really interesting because in the midst of all this amazing technology and things that are happening, there's some kind of counter-revolution going on. There is a resurgence of interest in past treatments and dietary supplements, especially the kind that some in the pharmaceutical industry like to label as unscientific.

But this whole effort is also generated and driven by IT. Because IT collects, links and integrates all information.

This rich biota has a lot to offer us.

And that's where about half of our medicines come from.

So it shouldn't be dismissed because it's a great opportunity to take advantage of this kind of result, and the random, loose trials of the last 1000 years on what affects our health.

And basically, it's about using our advanced technology to get something useful out of this sea of ​​noise.

In fact, this is more than just an abstraction.

I've just started a biotech company that uses this kind of approach to develop treatments for Alzheimer's and other aging diseases, and we're making a lot of progress.

So here we are.

It's the beginning of a new millennium.

Looking to the future means that future humanity will look back at this moment hundreds of years from now, well before the end of this millennium.

And you would think from the beginning of today's session that they would see this as this terribly difficult and painful time that we struggled to get through.

And I don't think that will happen.

They are going to do the same as everyone else. They will forget all that.

And they actually intend to make this moment romantic.

They will think of it as this glorious moment in which we laid the very foundations of their life, society and future.

It turns out that it is a bit like childbirth.

This is where this kind of bloody, terrible chaos happens.

And what will come out of it? New life.

In fact, as I pointed out earlier, we forget all the hard work it took to get there.

Therefore, it is clear to me that one of the cornerstones of that future is the restructuring of our biology.

It will be gradual at first. The speed will increase steadily.

we will make a lot of mistakes.

That's how these work.

It is an incredible privilege for me to be alive and witness this event.

It's a unique moment in the history of all life.

It will always be memorable.

And the amazing thing is that we are not just observers of this, we are the ones who design it.

I think we should be proud of that.

What is very difficult and challenging is that we are also subject to these changes.

It's our health, it's our life, it's our future, it's our children.

That is why they are so troubling to many people who recoil in fear.

I don't think our choice in life choices is to go down this path or not.

It is certainly so.

That's how it is in our hearts.

That's how we see it.

I think Thucydides spoke to us clearly in 430 BC. he phrased it well.

Once again, use the words in the same order he said them.

"The bravest men will be those who have the clearest grasp of what lies ahead, both glory and danger.

Nevertheless, they go out and run into it. ”

thank you.

(applause)

AlloSphere: This is a three-story metal sphere in an echo-free room.

Think of AlloSphere as a large, dynamically changing digital microscope connected to a supercomputer.

Twenty researchers can stand on a bridge suspended inside the sphere and fully immerse themselves in the data.

Imagine what it would be like if a team of physicists could stand inside an atom and observe and hear the rotation of electrons.

Imagine what it would be like if a group of sculptors could be inside a lattice of atoms and use that material to sculpt.

Imagine a team of surgeons able to dive into the brain as if there was a world, see tissues as landscapes, and hear blood concentration levels as music.

This is part of the research we are working on at AlloSphere.

First, let me tell you a little bit about this group of artists, scientists, and engineers working together.

I am a composer, orchestra trained and inventor of AlloSphere.

Together with fellow visual artists, we visually and acoustically map complex mathematical algorithms unfolding in time and space.

Our fellow scientists are discovering new patterns in information.

And our engineering peers are building one of the world's largest dynamically changing computers for this kind of data exploration.

From biological macroscopic data to electron spins, five AlloSphere research projects are presented.

This first project is called AlloBrain.

And it is our attempt to quantify beauty by discovering which areas of the brain are interactive when witnessing something beautiful.

You're flying through my colleague's brain cortex.

Our story here is visually and acoustically mapped real fMRI data.

The brain is now a world we can fly around and interact with.

I see 12 intelligent computer agents, little squares flying together in my brain.

They are mining blood concentration levels.

And they are reporting it to you by sound.

A higher density level means more activity in that part of the brain.

They are actually singing these densities to you with higher pitches mapped to higher densities.

An upcoming artistic and scientific installation will move from real biological data to biogenetic algorithms that produce artificial nature.

Biogenetic algorithms help us understand self-generation and growth in this artistic and scientific installation. This is very important for simulations in nanoscale science.

For artists, we create new worlds to discover and explore.

These generative algorithms grow over time, interacting and communicating like swarms of insects.

Our researchers manipulate this data by injecting bacterial code, a computer program that allows these organisms to grow over time.

We now move from the biological and macroscopic worlds to the atomic worlds and enter the atomic lattice.

This is real AFM (Atomic Force Microscopy) data from our colleagues at the Solid State Lighting and Energy Center.

They discovered a new bond, a new material for transparent solar cells.

We are flying through a lattice of 2,000 atoms such as oxygen, hydrogen, and zinc.

A triangle bond appears.

Four blue zinc atoms are bonded to one white hydrogen atom.

You can see the flow of electrons with streamlines that we artists have created for scientists.

This makes it possible to find bond nodes in any lattice of atoms.

We believe it creates beautiful structural art.

The sound you are hearing is the actual emission spectrum of these atoms.

We mapped them into the audio domain, so they will sing to you.

Oxygen, hydrogen and zinc each have their own characteristics.

From this lattice of atoms to a single hydrogen atom, you actually end up moving further down.

We are collaborating with a physicist colleague who will provide us with the mathematical calculation of the n-dimensional Schrödinger equation in time.

What you're seeing here now is the superposition of electrons in the lower three orbitals of the hydrogen atom.

You are actually hearing and seeing the electrons flow with the wire.

The white dots are stochastic waves that indicate where the electron is in a particular time and space in this particular three-orbital configuration.

You'll quickly transition to a two-orbital configuration and notice the pulsing.

And you will hear a swell between the sounds.

This is actually a luminary.

As sound begins to pulsate and contract, physicists can tell when a photon is emitted.

They are beginning to discover new mathematical structures in these calculations.

And they have a better understanding of quantum mathematics.

Moving further down, we proceed to a single electron spin.

This will be the last project I will show you.

Our colleagues at the Center for Quantum Computing and Spintronics are actually measuring laser decoherence in single electron spins.

We took this information and created a mathematical model from it.

We are actually seeing and hearing the flow of quantum information.

This is very important for the next step of simulating quantum computers and information technology.

These simple examples I have given are intended to give you an idea of ​​what we are doing at the University of California, Santa Barbara to integrate art, science, and engineering to usher in a new era of math, science, and art.

Please come and see Alosphere.

It inspires us to think of new ways to use this unique instrument that we created in Santa Barbara.

thank you very much.

(applause)

Before the human world began, there was a world of gods consisting of fields, plains and gardens.

Four brothers were wandering in this heaven.

They had no family other than each other and didn't even know who their parents were.

One of the brothers, Deminan, had a different appearance than the others.

His skin was covered with painful scabs, and he wondered why he was the only one to suffer this affliction.

One day, while the Supreme Spirit Yaya was out in the garden, Deminan and his brothers sneaked into Yaya's house.

After feasting and exploring, they find a giant gourd hanging in the corner.

However, when I tried to look inside the gourd, I dropped the gourd.

The gourd cracked and a great flood swept the brothers away, forever separating them from the heavenly land.

The water coming out of the gourd has formed a new world.

This realm was covered by an ocean that did not exist in the world of the gods.

The waters were full of fish and other creatures and were dotted with islands and caves.

This sea-world too was completely cut off from heaven, and the brothers wandered even more lost and aimless than before.

One day, the three brothers happened to find a house.

An elder named Bayayamanakao lived in that house and invited them in.

When Deminan caught up with him a little later, he followed them into the house.

Mr. Bayayamanakao told his brothers that he was his grandfather and gave them a special cassava bread.

He revealed their lineage to them. Their mother, Mother Goddess Itibi Kahubaba, died when they were born.

The brothers thanked him for his hospitality and insight into their past.

But then Bayayamanakao went to Deminan and blew cigarette spit on Deminan's back through his nose.

The place where the saliva fell immediately became swollen and painful.

Soon Deminan was deranged, his back swelled, and his brothers feared he would die.

Not knowing what else to do, they cut open the welts.

A tortoise came out of the wound and swam away, easing back and forth between sea and land.

When Deminan recovered from his delirium, he finally understood what the curse of his illness meant. He was a Caracaracol and could communicate with the gods.

He was the link between the celestial realm and the earthly realm.

Deminan was the first in a long lineage of Caracaracols.

The world of the sea that he and his brothers dropped the gourds to became the world of men, and the Caracaracols who pursued Deminan maintained a delicate balance between humans and gods.

But their unique power came at a price. Deminan and all the Caracaracols who followed him continued to suffer from the disease that initially characterized Deminan as something special.

Taino carvings and figurines show swollen backs and gaunt arms, and Cara Caracol is both cursed and blessed as a conduit between worlds.

This is my nephew Yuan Yuan.

5 years old and very cute.

I asked him the other day, "What do you want for your birthday this year?"

"I want a magic mirror Spider-Man mask," he said.

I had no idea what he was talking about, so I said, "Wow, that's really cool, but how do you make sense of it?"

He said to me without blinking, "I'm going to tell my mom and make a wish before I go to sleep.

My mother goes to wave her mobile phone.

When you wake up the next morning, the delivery guy will give it to you. ”

I tried to make fun of him, but suddenly I realized he was just telling me the truth, what shopping is like for this generation.

Come to think of it, for a kid like Yuan Yuan, shopping is a very different concept than my generation had in mind.

Shopping is always mobile and all payments are virtual.

China is currently undergoing a huge shopping revolution.

Shopping behaviors and technology platforms are evolving differently than the rest of the world.

For example, China's e-commerce is booming.

It's growing twice as fast as the US, with much of that growth coming from mobile.

Every month, 500 million consumers make purchases on their mobile phones, equivalent to the combined populations of the United States, United Kingdom and Germany.

But it's not just the scale of e-commerce that matters, it's the speed of adoption and the convergence of the ecosystem.

It took less than five years for China to become the land of mobile commerce, thanks in large part to two technology platforms: Alibaba and Tencent.

They own 90 percent of e-commerce, nearly the entire market, 85 percent of social media, and 85 percent of internet payments.

We also have a large amount of digital content, videos, online movies, literature, travel information and games.

When this huge base of mobile shoppers meets the collective ecosystem, there will be chemistry.

Today, China is like a giant laboratory that produces all kinds of experiments.

You should come to China because you can get a glimpse of the future here.

One trend I've seen is around shopping spontaneity.

Five years ago, a fashion survey found that Chinese consumers buy between 5 and 8 pairs of shoes on average.

This number has tripled to reach about 25 pairs of shoes per year.

Who would need that many shoes?

So I asked them, "Why are you buying?"

They gave me a list of inspirations such as blogs, celebrity news, and fashion tips.

But in fact, for many of them, there was no particular reason to buy.

They were just browsing the mobile site and buying whatever they saw.

We have observed the same level of spontaneity in everything from grocery shopping to purchasing insurance products.

But if you think about it, it's not that hard to understand.

Many Chinese consumers are still new to the middle-class and upper-middle-class lifestyles and have a strong desire to buy everything new, new products, and new services.

And thanks to this integrated ecosystem, purchasing is as easy as one click.

But this new shopping behavior poses many challenges for once-dominant companies.

One fashion company owner told me that she was very frustrated with her customers constantly complaining that her products weren't new enough.

Well, that's a really bad comment for a fashion company.

And he's already increasing the number of products in each collection.

It doesn't seem to work.

So I told him there was something more important than that.

You need to give consumers exactly what they want when they still want it.

And he can learn something from Chinese online apparel players.

These companies collect real consumer feedback from mobile sites and social media, and designers translate this information into product ideas and send them to microstudios for production.

These micro-studios are very important in this whole ecosystem as they can take small orders of 30 pieces at a time and even create partially customized pieces.

The fact is that all of these production designs are done locally, and the entire process of getting the goods to the shelf or online can take as little as 3-4 days in some cases.

It's super fast and very sensitive to what's on the market and what's being watched.

And that's a big headache for traditional retailers who only think about a few collections a year.

And then there's the consumer's need for ultra-convenience.

A few months ago, I was shopping with a friend in Tokyo.

We were inside and there were 3 or 4 people standing in front of us at the checkout counter.

Pretty normal, right?

But we both gave up on our choice and walked away.

That's how impatient we are.

Providing a super-convenient service isn't just a nice-to-have.

It's important to make sure the consumer is actually buying.

And in China, I learned that convenience is the glue that makes online shopping a behavior and a habit.

In some cases, it's more effective than a loyalty program alone.

Take Hema.

This is a retail grocery concept developed by Alibaba.

From 4,000 SKUs, we'll deliver a basketful of products to your doorstep in less than 30 minutes.

The amazing thing is that they deliver literally anything, including fruits and vegetables.

They also deliver live fish and live Alaskan king crab.

As a friend of mine once said to me, "This is really my dream come true.

Finally, you can impress your mother-in-law when she unexpectedly visits you for dinner. ”

(Laughter) Well, companies like Amazon and FreshDirect are experimenting in the same space.

The fact that Hema is part of the Alibaba ecosystem makes it faster and a little easier to implement.

It is very difficult and very costly for an online grocery store to deliver a basketful of goods quickly, but Hema has a mobile app and mobile payments, and is building 20 brick-and-mortar stores in a high-density area in Shanghai.

These stores are built to ensure the freshness of their products, they actually have fish tanks inside the stores, and they also provide a location that allows for fast deliveries.

I know the questions you have.

are they making money?

Yes they are making money.

Break-even, and even more amazing, sales revenue per store is 3-4 times higher than traditional grocery stores, with half of revenue orders coming from mobile.

This is evidence that consumers will soon switch to online shopping behaviors if we provide them with something truly helpful and highly convenient for their grocery shopping.

Super convenience and spontaneity, but that's not all.

Another trend I've seen in China is social shopping.

If you think about social shopping elsewhere in the world, it's a linear process.

Find something to watch on Facebook, then switch to Amazon or brand.com to complete your shopping.

clean and simple.

But in China it's completely different.

On average, consumers spend an hour shopping on their mobile phones.

That's three times the size of the United States.

Where does the stickiness come from?

What are they actually doing on this tiny little screen?

Let me guide you through my usual mobile shopping journey.

It's 11pm, yes, it's time for me to shop.

I was chatting with my friend in a WeChat chat room.

One of them pulled out a pack of snacks and posted a product link in the chat room.

i hate it. Because they usually click on that link to go to the product page.

It's informative, colorful, and exciting.

As I was looking at it, a clerk came online and asked, "Can I help you with anything tonight?"

Of course, I bought a pack of those snacks.

Even better, I know that pack of snacks will be delivered to my office around noon the next day.

You can eat it and share it with your co-workers, and shipping costs up to $1.

When I was about to leave that shopping site another screen popped up.

This time it's a livestream where grassroots celebrities teach us how to apply new shades of lipstick.

I watched it for about 30 seconds and it was very easy to understand and there was a shopping link right next to it that I clicked and bought in seconds.

Go back to your chat room.

Gossip is still going on.

Another friend of mine posted a QR code for another pack of snacks.

Click to buy.

So the whole experience is like exploring an amusement park.

It's chaotic, fun, and even a little addictive.

This is what is happening when you have this integrated ecosystem.

Shopping is embedded in social, and social is evolving into a multidimensional experience.

Ecosystem integration reaches a whole new level.

The same holds true for all aspects of our lives.

And of course, there is a huge commercial opportunity behind it.

Chinese snack company Three Squirrels has built a $500 million business in just three years by investing in 300-500 store clerks who serve it online 24/7.

In the social media environment, they are like friends next door.

Even when you don't buy things, they will happily tell you a few jokes and make you happy.

In this integrated ecosystem, social media can really redefine the relationship between brands, retailers and consumers.

These are just a few of the big changes I've seen in China.

Many experiments are performed every day in this huge laboratory.

Ecosystems, supply chain distribution, marketing, product innovation, everything is being reformed.

Consumers are empowered to decide what, when and how they want to buy and how they want to interact.

Global business leaders are once again being asked to truly open their eyes, see what is happening in China, think and act.

thank you.

(Applause) Massimo Portincasso: Angela, what you told us is really impressive and incredible, but I think a lot of people in the audience had the same questions as I did. Is this kind of impulsive consumption economically and environmentally sustainable in the long term?

And what is the total amount to be paid for such an automated and highly convenient retail experience?

Angela Wang: Right. One thing we must keep in mind is that we are, in fact, at the very beginning of a major transformation.

As consumer needs change and the ecosystem evolves, many opportunities and challenges arise.

So, I've seen some early signs that the ecosystem is shifting its focus to solving these challenges.

For example, focusing on sustainability as well as speed, and quality rather than quantity.

But there really are no simple answers to these questions.

That is exactly why we are here to tell you that we need to observe, study and participate in this evolution.

MP: Thank you.

AW: Thank you.

(applause)

This is Tim Ferris, circa 1979 AD, 2 years old.

As you can see from my power squats, I was a very confident boy. Not without reason.

At that time, I had a very attractive daily routine. It was waiting until late at night when my parents would be freed from their busy work day, doing crossword puzzles and watching TV.

I ran into the living room, jumped on the sofa, tore off the cushions, threw them on the floor, screamed from the bottom of my heart and ran. Because I was the Incredible Hulk.

(Laughter) You can clearly see the similarities.

And this routine continued for some time.

When I was 7 years old, I went to summer camp.

My parents thought I needed it for peace of mind.

And every day at noon, the campers went to the pond with the floating dock.

You can also jump from edge to deep edge.

I was born prematurely. I have always been very small.

I was born with a collapsed left lung.

And I always had buoyancy issues.

Water was originally scary.

But I was in sometimes.

And on one particular day, campers were jumping over inner tubes and diving under inner tubes. And I thought this would be a lot of fun.

So I dove through the inner tube and the camp bully grabbed my ankle.

And when I tried to stand up to put some air in, my hip hit the bottom of the inner tube.

And then I went mad and thought I was going to die.

Luckily a camp counselor came along and separated us.

Since then, I have become afraid to swim.

That's something I couldn't get over.

My inability to swim is one of my greatest humiliations and embarrassments.

That's when I realized I wasn't the Incredible Hulk.

But this story has a happy ending.

I'm 31, which is my age now. In August, I spent two weeks revisiting swimming, questioning every obvious aspect of it.

And from swimming 1 lap, or 20 yards, like a drowning monkey, with a heart rate of about 200 beats per minute, to Montauk, Long Island, near where I grew up, jumping in the ocean, swimming a kilo in the open sea, and walking out feeling better than when I went in.

And I walked out feeling like the Incredible Hulk in my European-style Speed.

And by the end of this presentation, I want everyone here to feel like the Incredible Hulk.

Specifically, I want them to feel that they can be excellent long-distance swimmers, world-class language learners, and tango champions.

And I would like to share my art.

If I have any art, it is deconstructing the things that really scare me.

So let's move on.

Swimming, first principles.

First principle, this is very important.

I have found that the best outcomes in life are often hampered by false concepts and untested assumptions.

Then came a turning point in the swimming world when a friend of mine said, "If I can complete a one-kilometer open-water race, I'll live one year without using any stimulants." This friend drinks six double espressos a day.

Then the clock started ticking.

I started looking for triathletes because I realized that lifelong swimmers were often unable to teach what they were doing.

I tried the kickboard.

My legs cut through the water like a razor and I couldn't even move. I stare at my feet and walk away depressed.

Hand paddles, everything.

I even took lessons with Olympians, but nothing helped.

And Chris Sacca, now a dear friend of mine, who built an Iron Man with a temperature of 103 degrees, said: "I answer your prayers."

And he introduced me to the work of a man named Terry Laughlin, the founder of Total Immersion Swimming.

That led me down the path of studying biomechanics.

So, for those of you who are afraid or not good at swimming, here are the new rules of swimming.

The first is to forget about the kick. Very counterintuitive.

So it turns out that propulsion isn't really an issue.

The average swimmer only transfers about 3% of their energy expenditure into forward motion, so kicking harder won't solve the problem.

The problem is fluid dynamics.

So what you want to focus instead on is getting your lower body flowing behind your upper body, similar to how small cars come behind big cars on the highway.

And it is done by maintaining a horizontal body position.

The only way to do so is to not swim over water.

The body is heavier than water. At least 95 percent of it will naturally submerge.

So with freestyle, you end up lying on your stomach and reaching above the water rather than swimming as many people think.

But in practice, it rotates from the right streamline to the left streamline and maintains that torso position for as long as possible.

Now let's look at some examples. I'm Terry.

And you can see him stretching his right arm far in front of him under his head.

And his whole body is really under water.

Extend your arms under your head.

The head is kept in line with the spine, allowing you to strategically use water pressure to raise your legs. This is very important, especially for people with a lot of fat in the lower body.

Below is an example of a stroke.

So don't kick. But with small flicks.

You can see that this is the extension on the left.

Then we see his left leg.

A small flick, whose sole purpose is to rotate your hips so you can reach the other side.

And his right hand portal, notice, he's not reaching forward to grab the water.

Rather, he's pushing his forearms into the water at a 45-degree angle to streamline and propel him. This is very important.

The above is incorrect. This is what almost all swim coaches teach.

It's not their fault, to be honest.

We'll talk about implicit and explicit later.

Below is an indication that most swimmers will be able to do the same as I am. This increases from 21 strokes per 20-yard length to 11 strokes in two workouts without a coach and without video surveillance.

And now I love swimming. I can't wait to go swimming.

I will do swimming lessons for myself later if anyone wants to participate.

Last is breathing. Indeed, it is a problem that many people have while swimming.

In freestyle, the easiest way to solve this is to turn with a body roll and just look at your recovery hand as you enter the water.

And it will get you very far.

that's it. That's all you really need to know.

language. materials and methods.

Like many people, I have come to the conclusion that I am not good at languages.

I struggled with Spanish in junior high school and first year of high school, but the sum of my knowledge was about "donde esta el bano?"

I couldn't even hear the answer. It's a sad situation.

Then, in my sophomore year, I transferred to another school and chose another language. Most of my friends were taking Japanese classes.

So I thought why not punish myself. I will speak Japanese.

Six months later, I had the opportunity to go to Japan.

My teachers told me, "Don't worry."

To cope, I take Japanese classes every day.

It will be a wonderful experience.” Actually, it was my first overseas experience.

So my parents encouraged me to do so. I left.

Arrived in Tokyo. wonderful.

I couldn't believe I was on the other side of the world.

I met my host family. All things considered, I think things went very well.

On the first night before my first day at school, I said to my mother very politely: "Wake me up at 8am."

That's why I didn't say (Japanese) even though I said (Japanese). I said, (Japanese). pretty close.

But I said, "Please rape me at 8am."

(laughter) I have never seen a Japanese woman so confused.

(Laughter) I walked to school.

Then the teacher came to me and handed me a piece of paper.

I couldn't read any of the characters - hieroglyphs maybe - but they were Kanji, Chinese characters adapted to Japanese.

I asked him what this meant.

And he said, "Oh, okay, okay, uh, world history, uh, calculus, traditional languages." and so on.

And it came to me like a wave.

Something was lost during translation.

The Japanese class itself was not a Japanese instruction class.

These were the normal high school curricula for Japanese students, the 4,999 non-American Japanese students.

And that's pretty much my answer.

(Laughter.) And that's what drove me to panic and search for the perfect language method.

i tried everything. I went to Kinokuniya.

I tried all kinds of books, all kinds of CDs.

Nothing worked until I found this.

Common Kanji. This is a tablet, or rather, a poster of 1,945 commonly used characters established by the Ministry of Education in 1981.

Many Japanese publications limit themselves to these characters to promote literacy. Some publications require reading and writing.

And this has become my Holy Grail, my Rosetta Stone.

As soon as I focused on this material, it took off.

In the end, after about 6 months, or 11 months in total, I was able to read the Asahi Shimbun and went from Japanese I to Japanese VI.

At the age of 16, I returned to the United States to work as a translator, and now continue to apply this material, rather than methodical, approach to nearly a dozen languages.

A person who is weak in language and always speaks, reads, and writes 5-6 words.

The point here is that often the deciding factor is what you do, not how you do it.

This is the difference between being effective, doing the right thing, and being efficient, doing things well whether they matter or not.

You can also do this using a grammar.

After much experimentation, I came up with these six sentences.

With a native speaker, you can break down the grammar by translating these sentences into past, present, and future, revealing subjects, objects, verbs, indirect objects, direct object placement, gender, and more.

From that point on, you can learn multiple languages ​​if you want, alternating between them so as not to interfere.

If anyone is interested, let's talk about it.

And now I love languages.

Therefore, ballroom dancing, implicit or explicit, is very important.

You might look at me and say, "That guy must be a ballroom dancer."

But no, it's wrong. Because my body is very poorly designed for most things. Probably pretty well designed for lifting heavy stones.

I used to be bigger and more muscular.

And this is how I ended up walking.

I looked a lot like our cousin the Orangutan, or the Incredible Hulk.

Not very suitable for ballroom dancing.

In 2005 I was in Argentina and decided to see a tango class, but had no intention of attending.

Went inside, paid 10 pesos and walked in - 10 women, 2 men, usually a good ratio.

The instructor says, "You are also participating."

Immediate: Sweat of Death.

(laughter) I was sweating with fear of fight or flight. Because I challenged ballroom dancing in college. I stepped on the girl's foot with my heel. she cried.

Her perception of what I was doing bothered me so much that it exploded in my face and I never went back to ballroom dancing clubs.

She came over and this was the teacher's approach.

"Okay, now get me."

Nice assistant instructor.

She was so upset that I pulled her out of advanced practice.

So I did my best. I didn't know where to put my hands.

And then she stepped back, put her arms down, put them on her hips, turned around and yelled across the room, "This guy's built like a mountain of crazy muscles and he's grabbing me like a fucking Frenchman."

(Laughter) Everyone burst into laughter. I was humiliated.

she's back She said, "Well, we don't have a day."

As someone who's been wrestling since the age of eight, I started beating her in the "mouse and man" style.

And she looked up and said, "I'm better now."

So I bought a month's worth of classes.

(Laughter) And I wanted to set up a competition to set a deadline, so I looked up Parkinson's Law. The complexity of the task is that it grows until it fills the allotted time.

Therefore, the contest deadline was very short.

I first had a female instructor teach me the role of a follower. This is because I wanted to understand the sensibilities and abilities necessary for follow-up to nurture so that students would not repeat a year in college.

I then worked with her to examine the characteristics of the abilities and elements of the various championship-winning dancers.

I interviewed these people because they all taught in Buenos Aires.

Comparing the two lists, we see that there are clear recommendations for expertise and specific training methods.

And there was an unspoken common denominator that no one seemed to practice.

Argentinian dance teacher protectionism aside, I found this very interesting. So I decided to focus on three of these commonalities.

long steps. So there are a lot of milonguero. Tango dancers use very short steps.

I found the long steps to be much more elegant.

In fact, you can do it in a very small space.

Next are the different types of pivots.

Third is the change in tempo.

If you want to compete with people who have been practicing for 20-30 years, it seemed like you could leverage those three areas to compete.

That photo is from the Buenos Aires Championship semi-final four months later.

A month later, I was at the World Championships and made it to the semi-finals. Two weeks later, he set a world record.

I would love to see some of what you have done.

Let's jump forward here.

This is the instructor that Alicia and I chose for our male lead.

His name is Gabriel Miss.

One of the most elegant dancers of his generation, he is known for his long steps, tempo changes and pivots.

Alicia is quite famous in her own right.

So I think you'll agree too, they look great.

What I love about this video is that it's actually a video of them dancing together for the first time thanks to his lead. he had a strong lead.

He didn't lead with a chest that required him to slouch.

I couldn't develop the toe qualities or the strength of my legs to make it happen.

So he uses a lead with an emphasis on the shoulder girdle and arms.

For example, he can lift and break women.

That's just one of its advantages.

So I took it apart.

This is an example of one pivot.

Backstep pivot.

There are many different types.

I have hundreds of hours of footage, all categorized the way George Carlin categorized comedy.

So I used my nemesis, the Spaniards, to learn tango.

So fear is your friend. Fear is an indicator.

Sometimes it tells you what not to do.

It often tells you exactly what to do.

And the best results, the most fun times I've had in my life, have all started with asking the simple question, "What's the worst thing that could happen?"

Especially when it comes to the fears I got as a child.

Apply your analytical frameworks and abilities to old fears.

Apply them to your very big dreams.

And considering what I'm afraid of now, it's so simple.

When I imagine my life, I wonder what my life would have been like without the opportunity for education.

For the past two years, I have worked to dismantle, modify or replace America's public school system.

And so far, we have conducted experiments with about 50,000 students. Readers, I would say that about 6 schools have been built at this point.

And if any of you are interested in that, I would love to talk to you.

i don't know anything I am a beginner.

But I have a lot of questions, so any advice would be appreciated.

thank you very much.

(applause)

It's very simple. I've been rock climbing for 35 years and I've discovered like 9 rules.

Most of them are very basic.

The first is to not let go. This is a surefire way to succeed.

But really, really often I think about letting go long before my body does.

So, good luck. Then you'll come up with a rather strange solution.

Number two: Hesitation is bad.

This is a friction climb up the Tuolumne Meadows in Yosemite Highlands.

There's nothing like a hard positive edge in friction climbing.

It climbs over small dimples and bumps in the rock.

The most friction is when you first put your hand or foot on the rock.

And from that point on, you basically fall.

So the momentum is good. Please don't stop.

Rule #3: Make a plan.

This is a climb called Naked Edge in Eldorado Canyon outside Boulder.

This climber is on its final pitch.

He's actually exactly where I fell.

There are about 1,000 feet of air under him.

And all the hard pitches are actually under him.

A lot of the time you're planning hard, like, "How am I going to get over the hardest part? How am I going to get over the hardest part?"

So what happens?

Reach the final pitch. It's easy.

And you are completely on fire. stop it.

Reaching the summit requires planning ahead.

But don't forget that you also need to be able to complete each move.

This is a trail called the Dyke Route at the Payjack Dome in the Yosemite Highlands.

The interesting thing about this climb is that it's not that difficult.

But if you're standing on top of it, the hardest move you'll make will drop you off a low-angle slab from a height of about 100 feet.

So you have to concentrate.

Don't stop like Coleridge's Kubla Khan.

I have to continue.

Rule #5: Know how to rest.

very. The best climbers are those who can rest, regroup, calm, focus, and position themselves to keep going, even in the most extreme conditions.

This is also a climb at Needles in California.

Fear is really the worst because it means you are not focused on what you are doing.

You are focused on the consequences of failing at what you are doing. Because any action requires all your concentration and thought process to perform it effectively.

One of the things about climbing is that most people take it head on. And they follow the most obvious solutions.

This is Devil's Tower in Wyoming. This is the columnar basalt formation most people probably know from "close encounters".

This usually causes crack climbers to put their hands in and their toes in and just start climbing.

The crack is too small for your toes to enter, so the only way to climb is to use your fingertips in the crack and use opposing pressure to push yourself up.

Rule #8: Strength doesn't always mean success.

In my 35 years of being a climbing guide and teaching indoor walls and such, the most important thing I've learned is that men always try to do pull-ups.

Beginners can thrash, thrash, climb 15 feet, do 15 pull-ups just fine, and then they burn out.

Women are much more balanced because they don't have the idea that they can do 100 pull-ups.

They figure out how to put their weight on their feet, and it's kind of natural. Because you carry it all day long.

Therefore, balance is very important and it is important to keep your weight on your strongest muscles, your feet.

And, of course, there's rule number nine.

I came up with rule number 9 after I slipped about 40 feet and cracked a rib, even though I didn't really mean to fall.

Once you get to the point where you know it will, you need to start thinking about how you let go. This is an important part of not getting hurt, so how do you fall onto the rope, or if you're climbing without a rope, where you can actually control your fall.

So don't wait till the last minute.

thank you very much.

(applause)

As June said, I'm here today to talk about a project my twin sister and I have been working on for the past three and a half years.

I'm making a coral reef with crochet.

And there are actually hundreds of people around the world on this project, working with us. In fact, thousands of people are actually involved in many of the different aspects of this project.

The project now spans three continents, with roots in mathematics, marine biology, women's handicrafts and environmental activism.

That's true.

It's a very beautiful way, and it's also a project where this development really parallels the evolution of life on Earth. This is especially nice to say here in February 2009. As one of our previous speakers told us, this year marks the 200th anniversary of Charles Darwin's birth.

We hope you can finish all this in the next 18 minutes.

First, let me show you what this looks like with some pictures.

To give you an idea of ​​the scale, the installation is about 6 feet wide and the tallest model is about 2-3 feet tall.

This is another image.

The one on the right is about 5 feet tall.

This task requires hundreds of different crochet models.

And indeed, today there are thousands of models contributed by people all over the world as part of this.

Tens of thousands of man hours have gone into this entire project, 99% of which is done by women.

On the right is part of an installation about 12 feet long.

My sister and I started this project in 2005. There was a lot of talk that year about global warming and its impact on coral reefs, at least in the scientific press.

Corals are very delicate organisms and are damaged by rising sea temperatures.

This causes massive bleaching, the first sign of coral disease.

And if bleaching doesn't go away, if temperatures don't go down, the reefs will start dying.

Much of this is happening on the Great Barrier Reef, especially coral reefs around the world.

This is our call at bleached reef crochet.

We founded a new organization called The Institute for Figuring. This is a small organization we started promoting to do projects on the aesthetic and poetic side of science and mathematics.

And I posted a little announcement on the site and asked for people to participate in this project.

To my surprise, one of the first people to call me was the Andy Warhol Museum.

And they said they were doing an exhibition about artists' response to global warming and wanted our coral reefs to be part of it.

I laughed and said, "I'm just starting, so you can eat a little bit."

So in 2007 we held this small exhibition of crocheted leaves.

And then some people from Chicago came over and said, "At the end of 2007, the theme of the Chicago Humanity Festival is global warming. And we have this 3,000 square foot gallery and we want you to fill it with your reef."

And I, naive at this stage, said, "Oh, sure."

I say "naive" here because my profession is actually a science writer.

What I do is write a book about the cultural history of physics.

I've written books on the history of the universe, the history of physics, and religion, and I've written for people like the New York Times and the Los Angeles Times.

So I had no idea what it meant to fill a 3,000 square foot gallery.

So I said "yes" to this suggestion.

Then I went home and told my sister Christine.

Christine is a professor at CalArts, one of Los Angeles' premier art colleges, and she knew exactly what it meant to fill a 3,000-square-foot gallery, and she almost had a seizure.

She thought I was crazy.

However, she fell in love with crochet.

Long story short, eight months later we filled the 3,000-square-foot gallery at the Chicago Cultural Center.

By this stage, the project had its own viral side and was completely beyond our limits.

The people of Chicago wanted not only to display our reef, but also to have locals build it.

So we went and taught techniques. We held workshops and lectures.

And the people of Chicago built their own reefs.

And it was displayed alongside ours.

Hundreds of people were involved in it.

We were invited to do it all in New York, London and Los Angeles.

In each of these cities, hundreds of local residents created coral reefs.

And more and more people get involved in this, most of whom I have never met.

So everything morphs into this organic, ever-evolving creature that's actually far beyond Christine and me.

Some of you are sitting here now thinking, "What planet are these people on?"

Why on earth are we weaving coral reefs?

Woolness and wetness aren't exactly two concepts that go together.

Why not carve a coral reef out of marble?

Cast it in bronze. ”

However, it turns out that many reef organisms have very specific structures, which is good reason for us to weave them.

The frilly sawtooth shapes found in corals, kelps, sponges, sea slugs, etc. are a type of geometry known as hyperbolic geometry.

And the only way mathematicians know how to model this structure is through crochet. That happens to be the case.

It's nearly impossible to model this structure any other way, and nearly impossible to do so on a computer.

So what is this hyperbolic geometry that corals and sea slugs embody?

In the next few minutes we will all be brought up to sea slug level.

(Laughter) This kind of geometry revolutionized mathematics when it was first discovered in the 19th century.

But it wasn't until 1997 that mathematicians really understood how to model it.

In 1997, Cornell University mathematician Dina Taimina discovered that this structure could actually be achieved by knitting and crocheting.

The first thing she did was knit.

However, you end up sticking the needle too far into the needle. So she quickly realized that crocheting was better.

But what she was really doing was creating models of mathematical structures that many mathematicians thought were impossible to model in practice.

And in fact, they thought something like this structure was impossible in itself.

Some of the best mathematicians have spent hundreds of years proving that this construction is impossible.

So what is this impossible hyperbolic structure?

Before hyperbolic geometry, mathematicians knew of two kinds of space: Euclidean space and spherical space.

And they have different properties.

Mathematicians like to characterize things in a formalistic way.

You have a sense of what planar space, Euclidean space, is.

But mathematicians formulate this in a special way.

And they are doing it through the concept of parallel lines.

So here we have the line and the points outside the line.

And Euclid said, "How do we define parallel lines?

I ask, how many lines can I draw through the points but never intersect the original line? ”

And you know the answer. Anyone want to shout it out?

one. wonderful. have understood.

That is the definition of parallel lines.

That's exactly the definition of Euclidean space.

But another possibility that you know is spherical space.

Consider the surface of a sphere, like a beach ball, which is the surface of the Earth.

There are straight lines on the sphere.

And I have a point outside the line. How many straight lines can you draw that pass through the points and do not intersect the original line?

What does it mean to talk about a straight line on a curved surface?

Now mathematicians have answered that question.

They realized that there is a generalized concept of linearity called a geodesic.

And on the surface of a sphere, a straight line is the largest circle that can be drawn.

So it's like the equator or lines of longitude.

So I ask again. "How many straight lines can you draw through the points that do not intersect the original lines?"

does anyone want to guess?

zero. very good.

Well, mathematicians thought it was the only option.

A little suspicious, right? So far there are two answers to this question. Zero and one.

Two answers? Perhaps there may be a third option.

For mathematicians, if there are two answers and the first two are 0 and 1, there is another number that immediately becomes the third choice.

Anyone want to guess what it is?

Infinity. You got it right. that's right.

Yes, there is a third option.

It looks like this.

There are straight lines and an infinite number of lines that pass through a point and never meet the original line.

Here is the drawing.

This almost drove mathematicians insane. Because they are sitting there feeling as confused as you.

Come to think of it, how could that be? I'm cheating The line is crooked.

But that's only because it's projected onto a plane.

Mathematicians have had to seriously struggle with this for hundreds of years.

How could they see this?

What does it actually mean to have such a physical model?

This is something like: Imagine that we have only ever encountered Euclidean space.

Then mathematicians came and said, "There is something called a sphere, and its lines meet at the North and South Poles."

But I don't know what the sphere is like.

And someone comes up and says, "Look, here's a ball."

Then, "Oh, I can see it. I can feel it."

You can touch it. You can play with it. ”

And that's exactly what happened in 1997 when Daina Taimina showed that models could be woven in hyperbolic space.

Here is a crochet diagram.

I pasted the Euclidean parallel postulate on the surface.

And the line looks curved.

But hey, you can take any of these lines and fold them along, so you can prove they're straight.

And it's a straight line.

So here, through the woolly, domestic femininity art, proves mathematics' most famous postulate to be false.

(Applause.) And you can stick all sorts of math theorems onto these surfaces.

The discovery of hyperbolic space started a branch of mathematics called non-Euclidean geometry.

And this is actually the branch of mathematics that underlies general relativity, which ultimately tells us about the shape of the universe.

So there is a direct line between the female craft, Euclid, and general relativity.

Well, mathematicians said they thought this was impossible.

Here are two creatures who have never heard of Euclid's parallel postulate. They are just working on it, not knowing that it is impossible to violate.

They've been doing it for hundreds of millions of years.

I once asked mathematicians why they thought this structure was impossible when sea slugs have been doing it since the Silurian.

Their answer was interesting.

They said, "Well, I don't think there are many mathematicians who sit and watch sea slugs."

That's true. But it's also deeper.

Much has also been written about what mathematicians thought mathematics was, what they thought could be done in mathematics and what it couldn't be, what was thought it could be expressed and what it couldn't be expressed.

In a way, even the freest mathematician of all thinkers literally couldn't see not only the sea slugs around him, but lettuce on his plate. Because lettuce and all curly vegetables are also hyperbolic geometry incarnates.

In a way, literally, they had such a symbolic view of math that they couldn't really see what was going on with the lettuce in front of them.

It turns out that the natural world is full of hyperbolic wonders.

And I also discovered that there are infinite taxonomies of crocheted hyperbolic organisms.

Chrissy, I, and our contributors started by creating a simple mathematically perfect model.

However, I found that if I deviated from the specific setting of the underlying mathematical code (i.e., a simple triplet, multiply by one algorithm) and added decorations to the code, the model soon started to look more natural.

And all of our contributors, who are amazing people from all over the world, have their own decorations.

So to speak, we have an ever-evolving, crocheted taxonomic tree of life.

Just as there is no end to the forms and complexity of life on Earth, small embellishments and complications in the DNA code lead to new ones like giraffes and orchids. Similarly, small ornaments on crochet cords lead to new and wonderful creatures in the evolutionary tree of crochet life.

So this project really has an inner organic life of its own.

There is a totality of all the people who have come there.

And their individual visions and commitments to this mathematical mode.

We have these technologies. we use them.

but why? What could be wrong here? what is that?

For Chrissy and me, one of the key things here is that these things suggest the importance and value of embodied knowledge.

We live in a society that tends to fully appreciate symbolic representations such as algebraic expressions, equations and codes.

We live in a society obsessed with presenting information this way or teaching information this way.

But through this kind of play, crochet, and other figurative play, people can work on the most abstract and highly theoretical ideas, the kind that usually have to go to college to study higher mathematics. It was there that I first learned about hyperbolic space.

But you can do that by playing with material things.

One of the ways we've come to think about this is that what we're trying to do with the Figuring Lab and projects like this is trying to create a kindergarten for adults.

And kindergarten was actually a highly formalized system of education established by a man named Friedrich Fröbel, a nineteenth-century crystallographer.

He believed crystals to be models for all kinds of expressions.

He has developed a radical alternative system that brings the most abstract ideas to the smallest children through physical play.

And he deserves a full lecture by himself.

The value of education is what Froebel championed through the plastic form of play.

We now live in a society with many think tanks and bright minds thinking about the world.

They have written books, papers, and great and iconic treatises called op-ed articles.

Chrissy and I, through The Institute for Figuring, want to propose another way of doing things: the Playtank.

And play tanks, like think tanks, are places where people can participate and work on great ideas.

But what we would like to propose is that the highest level of abstraction in mathematics, computing, logic, etc., can be approached not only by purely mental algebraic-symbolic methods, but by literally, physically testing ideas.

thank you very much.

(applause)

A few months ago we raised an issue with the community.

We were all given a range of integers from 0 to 100 and asked to guess the integer closest to 2/3 of the average of all guessed numbers.

So if the average of all guesses is 60, the correct guess is 40.

What number do you think is a correct guess of 2/3 of the average?

Let's try to figure out how to find the answer.

The game is played under conditions known to game theorists as common sense.

Not only do all players have the same information, but they also know that other players have the same information, and other players know what other players know, and so on infinitely.

Now, if everyone guessed 100, we would have the best possible average.

In this case, 2/3 of the average would be 66.66.

Everyone can figure this out, so it doesn't make sense to guess a value higher than 67.

If everyone playing came to the same conclusion, no one would guess a number higher than 67.

Currently, 67 is the new highest possible average, so a reasonable guess should be no more than two-thirds of that, which is 44.

This logic can be extended further.

With each step, the best possible logical answer keeps getting smaller.

So it seems prudent to guess the lowest possible number.

And indeed, if everyone chooses zero, the game reaches the so-called Nash equilibrium.

This is a state where all players are choosing the best strategy for themselves in view of what other players are playing, and individual players do not benefit from making different choices.

But that doesn't happen in the real world.

After all, people aren't perfectly rational, or expect each other to be perfectly rational.

Or perhaps it's a combination of the two.

Playing this game in a real world setting tends to average between 20 and 35.

The Danish newspaper Politiken played the game with over 19,000 readers, averaging around 22 with 14 correct answers.

Our viewers averaged 31.3.

So if you guessed that 21 was 2/3 of the average, you did well.

Economic game theorists have a way of modeling this interplay between rationality and practicality called k-level reasoning.

K represents the number of times the cycle of inference is repeated.

A person playing at k level 0 would approach the game naively, guessing numbers at random without thinking about other players.

At k level 1, the player assumes everyone else is playing at level 0, which averages 50, so he guesses 33.

At k level 2, guess 22, assuming everyone else is playing at level 1.

It takes 12 k levels to reach 0.

Evidence suggests that most people stop at the 1 or 2 k level.

Knowing this is useful because K-level thinking works in high-stakes situations.

For example, stock traders value stocks based not only on earnings reports, but also on the value other people place on the numbers.

And in soccer penalty kicks, both the shooter and the goalkeeper decide whether to go right or left based on what the opponent is thinking.

Goalkeepers often have pre-memorized patterns of their opponents, while penalty shooters know it and can plan accordingly.

In either case, participants should weigh their own understanding of the best course of action against how well other participants think they understand the situation.

But 1 or 2 K levels are by no means a hard and fast rule. Just being aware of this trend can help people adjust their expectations.

For example, what if people played 2/3 games knowing the difference between the most logical approach and the most general approach?

Use the form below to submit your own guesses as to what the new average 2/3 will be. I see that.

Shah Rukh Khan: Courage, determination and single-minded vision.

These are the qualities common to the greatest achievers.

They are brave hearts with no room for failure.

To us it looks like an unconquerable ocean, but to the next speaker it's a glamorous stage she was born to perform on.

So let's dive straight into the story of Bhakti Sharma, the fearless speaker who's making waves in the world of long-distance swimming.

Bhakti Sharma.

(Applause.) Bhakti Sharma: Imagine a two-and-a-half-year-old child riding behind her mother on a moped on a summer afternoon in the scorching heat of Rajasthan, not knowing where she was going.

After 20 minutes, the 2.5-year-old found himself completely submerged.

I found myself kicking, splashing, screaming, swallowing water, and clinging to my mother for my precious life.

That's how I learned to swim.

I started pool swimming at the age of 2.5 years old and open water swimming at the age of 14.

So I have dedicated more than 25 years of my life to the sport, during which time I have swum in all five oceans of the world, crossed the English Channel, also known as the Everest of swimming, and set world records in the frigid Antarctic Ocean.

(Applause.) When you spend a lot of time in sports, it's not just a sport, it's a mirror.

And it shows that you are a real human being.

Your mettle as an athlete is tested every day, not just on race day. The sport requires you to wake up at 4:30 in the morning, swim for 2 hours, go to school, come back and swim for 3 hours, come home, eat and sleep.

When you win a medal or set a world record, this mirror not only reflects the joy you and your loved ones feel, but also the tears you shed in the water alone.

Open water swimming is a very lonely sport.

I spent hours staring at the endless, bottomless ocean beneath my head, with nothing to sustain me but my own thoughts.

So I have been tested not only as a swimmer, but also as a thinking, feeling and imaginative person.

Whether it was my first test as a marathon swimmer, when I decided to swim 12 hours non-stop in the pool, or when I decided to cross the English Channel in 13 hours and 55 minutes.

When swimming, they do not speak or hear very well, and their vision is limited to what is in front of them or just below them.

This loneliness has been the greatest gift the sport has given me.

Through open water swimming, I got to know myself in ways I never expected.

I remember jumping into the ocean for the first time when I was 14. The waves were lifting and throwing me the whole time I was swimming, but I could see the kid in me enjoying such an adventure.

On the way across the English Channel, when I was stuck in one place for an hour and a half because of the current after already swimming for ten hours, I saw in me a strong and dedicated athlete who did not want to disappoint his parents or his home country.

When I won the first gold medal for India in the Open Water Marathon in Switzerland, I saw a proud Indian inside me.

As I was crossing the English Channel again, this time in a relay with my mother, I saw a protective daughter in me, not knowing we were making history. I just wanted to see my mother fulfill her dreams.

And four years ago, when I jumped into the Antarctic Ocean in nothing but a bathing suit, hat and goggles, with an unwavering spirit of just doing it, I saw a fighter in me.

When I jumped into that 0-1 degree Celsius water, I realized I was prepared for the cold in my body and mind, but what I wasn't prepared for was the density of the water.

It felt like it was pulling the oil out with each stroke.

And in the first five minutes, I had the numbing thought of giving up.

How nice would it be to forget all that and just be on a boat, standing under a hot shower, or wrapped up in a warm blanket?

But at the same time as that thought, a stronger, more determined voice welled up from the depths of my heart.

"You should know that there's a feeling inside of you that you're ready for another shot."

So I raised my arm and made a stroke.

"Okay, one more thing."

So I did my second and third stroke.

By the 4th picture, I could see penguins swimming under my stomach.

It came up to my left and started swimming with me.

"See? Penguins are rooting for you," said the voice inside.

(Applause and cheers) I looked up at my fellow boaters.

They had the same smile on their faces.

It's the same smile we all have when we're in trouble, when we see a glimmer of hope.

We take it as a sign from fate and just keep moving forward.

Like me, you set the world record for the longest Antarctic swim after 41 minutes.

(Applause.) Imagine, it doesn't even snow in Rajasthan.

(Laughter.) That voice has accompanied me throughout my swims and has carried me through difficult situations, but it would never have emerged if I hadn't spent a lot of time alone and paid attention to every thought that crossed my mind.

Whales, sharks, jellyfish and even demoralizing outsiders aren't the only dangers you face when you're alone at sea thinking.

But the more dangerous demons you face are the fear and negativity within you, telling you, "You're not good enough."

It never reaches the other shore.

you are not trained enough.

What if it fails? what do people think?

I'm sure everyone is thinking how slow you are right now. ”

We all have demons within ourselves, right?

In everyday life, you can hide from them behind work or other distractions.

But, as I said earlier, there is nowhere to hide in the middle of the ocean.

As much as I have to taste sea salt, feel the rubbing on my skin, and acknowledge a whale swimming next to me, I have to face my inner demons.

I hate it, and I love it too.

I hate it because this sport shows me a side of myself that I don't want to believe exists.

A side of me that is human and imperfect.

Like the part of me that can't get out of bed in the morning and make it to practice.

The side of me that is burnt out and exhausted and wants to quit swimming.

But I also love this sport. Because this sport has given me moments where I can look back when I feel discouraged.

And they bring me to my knees because I am so grateful.

Many people may not be able to swim continuously for hours.

But who do you spend the most time with?

You may share your outer space with many others, but there is one companion that you all always have, and that is you.

Yet most of us may never know who we really are.

I am a daughter, an Indian, a swimmer and a student.

But I am more than that.

No amount of “success” in life can bring you lasting joy or satisfaction if you haven’t invested in yourself, if you haven’t set a path that will bring you closer to yourself.

Even now, when I don't find motivation or joy in what I'm doing, I just ask myself, "Is this the best thing I can do right now?"

And my meaning of "best" also changes.

Sometimes it means not giving up and continuing to swim in freezing water to set a world record.

But many other days mean I can get over my depressing thoughts, step out of the house, and do my daily chores.

What hasn't changed is the inner voice.

An inner compass that guides me to a better me every day.

And I believe that a truly successful life is one spent in pursuit of being the best possible version of yourself when you take your last breath.

thank you.

(Applause.) SRK: I think the only sport I can't do is swimming. I will sink like a rock.

So standing next to one of the world's best swimmers makes me feel like I'm in the ocean, if you'll excuse my little joke.

But -- BS: (Laughter) Of course I'm not kidding.

SRK: But what is your next goal as a swimmer?

BS: I have a huge fear of competition, so could I set a better goal than aiming for the Olympics?

Because open water swimming has become an Olympic sport.

(Applause) Just saying it out loud makes me shiver. It's such a big goal that I hate to admit I set it, but that's the thrill and that's part of the job.

And my thinking is that it doesn't matter if I make it to the Olympics or not, but in the process of training for the Olympics I will become a better swimmer and a better person.

SRK: Inshara, you will compete in the Olympics.

And I want to say to many of you who are watching this show at home, there are so many of you and they are all thinking positively of you, so when you go to the Olympics, imagine all of us swimming with you in penguin suits and saying, 'Go on, go on, bhakti, go on, go on.'

BS: Will you be my personal penguin?

SRK: I am your penguin now.

It would have been cooler if you said shark or penguin -- BS: Killer whales are my heart animal, but you could be my killer whale.

(Applause) SRK: Ladies and gentlemen, Bhakti.

BS: Thank you.

(applause)

At the age of five, I fell in love with airplanes.

Now I'm talking about the 30's.

The planes of the '30s had two wings, round motors, and were always piloted by a guy who looked like Cary Grant.

He had high leather boots, jodhpurs, an old leather jacket, a great helmet, and great goggles. And of course, I also had a white scarf that fluttered in the wind.

He always approached the plane with some kind of walker, devil-worrying walker, brushed off his cigarette, caught and kissed the girl waiting here.

(Laughter) And, perhaps last but not least, I boarded his plane.

Of course, I always wondered what would have happened if he had kissed the plane first.

(Laughs) But this was a real romance for me.

All things flying at the time, you have to stop and think about it, it was probably the most advanced technology at the time.

So when I was younger I tried to approach this by drawing airplanes and always drew airplanes.

That's how I got part of this romance.

And, of course, in a way, when I say romance, I mean the aesthetics of the whole situation.

I think this word refers to the total experience centered on the product.

The product was that plane.

But it built romance.

Airplane parts also had French names.

Torso, Empanage, Nesser.

As you know, it comes from Romance languages.

I mean, it just entered your psyche.

it was mine.

I decided that I needed to get closer than just drawing an imaginary plane.

I wanted to make an airplane.

I built a model airplane there.

Then, in making an airplane model, it was found that the appearance drawing alone was not enough.

These cannot be transferred to the model itself.

If you want to fly, you must learn the discipline of flight.

I had to learn about aeronautics.

I had to learn what causes the plane to stay in the air.

And of course, for the models of the time, we had no control over that.

So I had to auto-restore and keep standing without crashing.

So I gave up on the approach of drawing fantasy shapes and converting them into technical drawings such as wing shapes and fuselage shapes, and had to build an airplane based on these drawings that I knew would follow some of the principles of flight.

By doing so, I was able to create a model that flies and stays in the air.

And once it hit the air, it contained a piece of romance that I fell in love with.

Well, the act of drawing airplanes prompted me to enroll in the aeronautical engineering department when I had the opportunity to choose a course at school.

And when I was sitting in class, to my surprise, no one asked me to draw an airplane.

I had to learn mathematics, mechanics, etc.

During class, I was wasting my time drawing airplanes.

One day a young man looked over my shoulder and said, "You are a very good painter.

You should belong to the art club. ”

And I said, "Why?"

And he said, "For one, there are more girls out there."

(Laughs) So my romance temporarily changed.

(Laughter.) And they appreciated painting, so I went into the art world.

I learned painting. It didn't go very well.

Experienced design, some architecture.

I ended up hiring myself as a designer.

And for the next 25 years, living in Italy and America, I shared a piece of this romance with everyone who would pay for this feeling, this aesthetic, an experience revolving around a designed object.

And it exists.

Has anyone been in a car? yesterday? -- On the track, you know the romance that revolves around performance cars.

Well, for 25 years I was mostly out in this piece of romance, and I didn't come back much. Because on-call design doesn't always lead to situations where you can create something of this nature.

So, 25 years later, I started feeling like I was depleting myself.

And I quit.

And I launched a very small operation that changed from 40 to 1 to rediscover my innocence.

I wanted to go back to where the romance was.

And even though I've done a lot of work on airplane interiors, I couldn't choose an airplane because at that point it had stopped being romantic.

I chose the furniture.

I chose chairs because I knew something about them.

Over the years I have designed many chairs for tractors, trucks, submarines and all sorts of things.

But not an office chair.

So I started it.

And it turns out there's a way to recreate the same approach you used on the plane.

Only this time, instead of making the shape with the wind, I made the shape with the human body.

Training means that just as an airplane has to learn a lot about how to work with the air, a chair has a lot to learn about how to work with the body and what it needs, wants, and shows.

In this way, after many twists and turns, we finally decided to design the chair that we are going to introduce to you.

I must say one more thing. When I was building model airplanes, I did everything.

I thought of the type of plane.

I basically designed it.

I built

And I flew it.

That's how I work now.

When I started making this chair, it was no preconceived notion.

Modern designs don't start with sketch styling.

I started about 8-9 years ago with a lot of vague ideas.

And that loose idea had something to do with what happened to people I know in offices and workplaces—people who work and use task seating, many of whom sit in front of computers all day.

And I feel that one of the things they don't need is a chair that interferes with their main purpose of sitting there.

So my approach was to make the chair do as much as humanly or mechanically possible, without having to fuss with it.

So my idea was that instead of sitting and reaching for a lot of controls, sitting in a chair would automatically balance my weight against the force needed to recline.

Now, that may not make much sense to some of you.

But you know that most good chairs have a reclining feature. This is because opening this joint between the legs and upper body is beneficial for improving breathing and improving flow.

So whether you're 5 feet tall or 6 foot 6, when you sit in my chair, the chair will always transfer the force needed to recline according to your weight, and you won't have to look for anything to adjust.

As I said before, this is a trade-off.

This has its drawbacks.

One is that we cannot accommodate everyone.

Some are very light, some are very heavy. Some people probably have more bodies in the upper part.

They start falling off the edge of the chart.

But most people don't adjust their chairs, so I felt a compromise was in my favor.

They will sit in it forever.

Someone told him that his sister had called him on the bus to the racetrack.

He said she has a nice new chair.

She said, "Oh, I love you."

"But it's too expensive," she said.

(Laughter.) So he said, "Okay, let's go over here and take a look."

he came and saw it.

he reached out. he pulled the lever. And the chair sank.

She said, "Great. How did you do that?"

And he showed her the lever.

Well, this is typical for many people who work sitting in chairs.

And why should you get a 20-page manual on how to move a chair?

(Laughs) I used to have it for my watch. 20 pages.

Anyway, I felt it was important that no adjustments were required to achieve such action.

I also felt that the armrests have not been adequately approached in terms of how useful they are for work.

However, I felt that having to individually adjust the armrests to position them where I wanted them was overkill.

I spent a long time on that.

I said I worked on it for eight or nine years.

And while each of these things kind of went in parallel, they gradually became their own issues.

I spent a long time figuring out how to move my arm in a larger arc, up and down, so that I didn't have to use a button, and finding a way to move my arm more easily.

So, after many trials and failures, I came up with a very simple mechanism that only requires moving one arm.

And they go up easily.

and stop wherever you like.

You can basically put it in a place where it won't get in the way.

No arms at all.

Or you can pull it up wherever you need it.

And this was another thing that I felt was slowly starting to incorporate aesthetic manipulation and aesthetic performance into their products, albeit not as romantically as Cary Grant.

The next thing that got me interested is that reclining is a very important factor.

And the more you can recline, the better, in some ways.

The more the angle between here and here opens up, and these days, with screens in front of you, you don't want your gaze to drop too far when you recline, so keep it about the same level, but shift your weight away from your tailbone.

Why don't you put your hands under your butt and touch your tailbone?

(laughter) Can you feel the bones under it?

(Laughter) It's exactly yours.

(Laughter) There are two, one on each side.

When you sit, all the weight of your upper body, arms, and head is transferred through your back, spine, and into your bones.

And that's quite a load.

Just by reducing the strain on your arm with an armrest, you can reduce that strain by 20%.

Now, if the spine is not held in the correct position, it will bend in the wrong direction.

So to unload that big weight, you can recline if it really exists.

Reclining takes a lot of the load off your lower end and transfers it to your back.

At the same time, as I say, open this joint.

And it has good ventilation.

But for that, if you recline to some extent, you'll need a headrest. Because most of the time it automatically keeps your head in a vertical position.

When reclined, the head is almost vertical.

If you recline a lot, you'll have to use muscle strength to hold your head there.

That's where headrests come in.

The headrest is difficult because it has to be adjusted enough to fit tall men and short women.

So here we are.

5 inches of adjustment is required here to place the headrest in the correct position.

But then, after looking around my office with chairs with headrests, I knew from experience that no one bothered to reach back and turn a knob to adjust the headrest and put it in place.

Also, it should be used in different positions when upright and when reclining.

So I knew it had to be resolved and should be resolved automatically.

When I recline this chair, the headrest clings to my neck.

Ideally, the head support should be placed right in the cranial area.

So it took me a long time to work out that part.

There are many other types of cushions and gels to put in.

We stole an idea from a bike seat and put gel in the cushions and armrests to absorb point loads. Distributes the load so there are no hard spots.

You can't beat your elbows down.

And I wanted to demonstrate the fact that chairs can accommodate people.

While sitting, you can adjust it to fit a 5 foot tall man or a 6 foot 6 year old man. All of this is possible within a few simple adjustments.

(applause)

While entertaining you with daring tales of her youth, it may be hard to believe that your grandmother was once a trapeze player.

However, back pain, elbow pain, and knee creaking, which are common in the elderly, are not simply "aging."

In fact, this cause of stiffness also plagues many young people.

The cause is arthritis. This arthritis causes inflammation and pain in the joints of more than 90 million people in the United States alone.

But are stiff, creaking joints really inevitable?

Why is arthritis so prevalent? Why can't we find a cure for this prevalent disease?

The first hurdle is that arthritis is actually a spectrum of over 100 different arthritis symptoms.

All of these conditions share common symptoms of joint pain and inflammation, but the causes and severity of these symptoms vary greatly.

Even the most common type of osteoarthritis is harder to prevent than you might think.

It is a common misconception that arthritis is limited to aging.

The origins of osteoarthritis can often be traced back to the patient's childhood, to seemingly mundane joint injuries.

After impact, immune cells rush to help cleanse and repair the damaged area and begin to excrete enzymes such as matrix metalloproteinases and aggrecanase.

These enzymes remove damaged tissue and cause inflammation.

However, while this rapid swelling helps protect the healing joint, inadequate tissue healing can cause immune cells to overreact.

As the influx of enzymes continues, cartilage begins to break down, weakening joints and later causing arthritis.

Not all causes of arthritis simply result from old sports injuries.

Take, for example, rheumatoid arthritis, which affects 1.3 million adults in the United States.

The condition is actually an autoimmune disease in which autoantibodies target naturally produced proteins, some of which are secreted by chondrocytes.

The cause of this behavior is still unknown, but as a result, the body treats joint tissue like a foreign object.

Immune cells infiltrate the joint even though there is no tissue damage to repair.

This response causes chronic inflammation and destroys bone and cartilage.

Yet another disease, spondyloarthritis, has similarities to both of the diseases we've covered so far.

Patients experience ongoing inflammation in joints and where ligaments and tendons attach to bone, even if there is no initial injury.

This causes the enzymatic flood and breakdown seen in osteoarthritis, but is driven by a variety of inflammatory proteins called cytokines.

As enzymes eat away at cartilage, the body attempts to fuse and stabilize small joints.

This process can cause growths called osteophytes, which also cause severe stiffness and joint pain.

Because there are so many factors that cause arthritis, our current treatments are tailored to address specific symptoms rather than the underlying cause.

These range from the promising MACI technology, which harvests cells from small pieces of cartilage to grow replacement tissue.

Using a technique called microfractures, the surgeon makes small holes in the bone and allows bone marrow stem cells to leak out and form new cartilage.

As a last resort, people with atrophied cartilage can have a complete joint replacement.

However, beyond these drastic measures, the underlying factors of autoimmune arthritis still present unique therapeutic challenges.

Scientists are advancing treatments to block TNF-α, one of the major proteins that cause inflammation in rheumatoid arthritis.

However, even this approach only treats the symptoms, not the causes.

Some of the best defenses against arthritis, on the other hand, are lifestyle choices. Maintain a healthy weight to reduce pressure on your joints, do low-impact exercise such as yoga or cycling, and avoid smoking.

As we continue to research treatments and cures for a wide variety of arthritis symptoms, these arthritis-fighting actions can help us live longer.

i'm an astronaut

I have been on the Space Shuttle twice and lived on the International Space Station for nearly half a year.

I often get asked the same question. It's like, "What's it like in space?"

As if it were a secret.

The universe belongs to all of us and I want to help you understand why it is such a magical place for all of us.

The day after my 50th birthday, I flew into space in a Russian capsule in Russia.

Launching is the most dangerous and the most thrilling of our activities.

3, 2, 1...lift off!

Every inch felt the controlled fury of a rocket engine blowing us off the planet.

We went faster and faster until after 8 1/2 minutes the engine died on purpose – kabun! --And we are weightless.

And the mission and the magic begin.

Dmitri, Paolo, and I cautiously approach the space station as we orbit the Earth in our small spacecraft.

An intricate dance takes place at 17,500 mph between a capsule the size of a smart car and a space station the size of a football field.

We arrive when the two ships dock with a gentle roar.

We opened the hatch, gave each other a weightless hug, and were now six.

We are a space family, an instant family.

What I liked most about living there was flying.

I liked it

It was as if I had become Peter Pan.

It doesn't mean it's floating.

With just a light touch of your finger, you can practically push the entire space station out, and it feels like pushing it in with your toes.

One of my favorite moments was drifting quietly through the roaring space station at night.

Sometimes I wondered if it knew I was just there in silence.

But it was also part of what was important to me to share that greatness with my staff.

A typical day in space begins with a perfect commute.

I wake up, walk down the lab, and greet the best morning view ever.

My commute is just 30 seconds, which is really fast, and I never get tired of looking out the window.

I think it serves as a reminder that we are actually still very close to the Earth.

Our crew was the second to use Canadian robotic arms to capture about a dozen different experiments and the only supply ship the size of a chocolate-laden school bus to be seen for the next four months.

Well, chocolate aside, each one of these experiments answered one more scientific question that is impossible on Earth.

So it's like another lens, where you can look at answers to questions like "What about combustion?"

"What about fluid mechanics?"

Well, I enjoy sleeping.

My favorite, that is, it doesn't matter if it's upside down or right side up. My favorite is curled up in a small ball and floating freely.

laundry? no.

We load our dirty clothes onto an empty supply ship and send it off into space.

Bathroom.

everyone wants to know.

It's hard to understand, so I made a little video because I wanted my kids to understand that the vacuum principle saves the day and that with just a breeze, everything goes its way.

Well, in real life it does.

(laughs) Recycle? of course.

Therefore, we collect urine, store it, filter it and drink it.

And it's actually delicious.

(Laughter) We sit around the table and eat food that looks bad but is actually very good.

But I think that gathering around the table is important both in space and on Earth, and that's what strengthens the cohesion of the crew.

For me, music was a way of staying connected to the world.

In honor of the 50th anniversary of manned spaceflight, I performed an earth-space duet with Jethro Tull's Ian Anderson.

Family ties were very important to me.

While there, I talked to my family almost every day and actually read to my son as a way to stay together.

Very important.

Now, as the space station passed over Massachusetts, my family ventured outside to watch the brightest stars cross the sky.

And although I couldn't see the house when I looked down, it meant a lot to me to know that while I was looking down, those I loved most were looking up.

For me, the space station is where mission meets magic.

This mission and commitment is an important step in our quest to go beyond the planet and is essential to understanding sustainability on our planet.

I love being part of it and if I could have taken my family there, I would never have left home.

So the view from the station showed that we were all from the same place.

We all have a role to play.

Because the earth is our ship.

Space is our home.

And we are the crew of Spaceship Earth.

thank you.

(applause)

Like many people around the world, earlier this summer my friends and I were obsessed with the Women's World Cup in France.

We are here to watch these amazing athletes. The goals were great and the game was clean and engaging. At the same time, off the field, these women are talking about equal pay and, in some countries, not getting paid for their sport at all.

So we were a little crazy and wanted to watch the game live and decided that one of the Spanish-speaking networks in the US would be a great place to start.

Then, a few games into the tournament, a friend of mine said to me: “Why do I feel like all I see are commercials for cosmetics, household cleaners and diets?”

It felt a little too obvious, and I don't know if we were sensitive about it, or the fact that we were watching with men and boys in our lives, but it felt a little too obvious that we were being targeted because we were women.

To be honest, it's not necessarily a bad thing.

Someone sat down and watched the tournament and said, "This is going to be watched by more women, these women are Hispanic because they're watching in Spanish, and this is female content."

So here is the perfect place for me to put all these commercials that are female-centric and probably nothing else. ”

As a marketer, I know that you should never get frustrated. This is the mission of marketers.

Marketers are tasked with building brands on very tight budgets, so they have a little incentive to sort people into buckets so they can reach their goals faster.

When I think about it this way, I feel like it's kind of a shortcut.

They use gender as a shortcut to reach their target consumers.

The problem is that while this argument seems logical, gender as a shortcut is actually not very good.

Even in this day and age, if you're blindly using gender perspectives in your marketing efforts, it's really just downright bad business.

Nor am I talking about backlash against stereotypes in advertising, which is a very real issue that needs to be addressed.

What I'm saying is that it's bad business to keep money on brands and products.

Gender is so easy to find, target and talk about in the marketplace that it actually distracts from the fun things that could drive brand growth, while at the same time continuing to create gender-centric segregation and perpetuating stereotypes.

So this activity is a double blow as it is bad for your business and bad for society.

And gender, like other demographics, has historically been one of the best marketing shortcuts.

But at some point, we forgot that we were fundamentally targeting needs like cooking, cleaning, personal care, driving, sports, and so on, and bucketed everything up and said, “Men and women are different.”

We got used to it and never tried it again. What's interesting to me is that we're still discussing this as a segment when it's most likely carryover bias. Attractive means a little crazy.

In fact, I did not come to this conclusion lightly.

We have enough data to suggest that gender is not the best place to start when designing and targeting a brand.

And I would go one step further and unless you're working on a gender-specific product category, perhaps anything else you're hypothesizing about consumers right now will be more helpful than gender.

We did not specifically plan to reach this conclusion.

we found it.

As consultants, our job is to accompany our clients to understand their businesses and help them find space for their brands to grow.

And it's our belief that if you want to find disruptive growth in the market, you have to go to the consumer and be very agnostic about the consumer.

You have to start over from scratch, remove yourself from the biases and segments you thought were important, and see where you're growing.

And we built ourselves an algorithm for just that.

So imagine that there is a person and you know what they are making about a product or service. From this person, you can find out their gender, as well as other demographics, where they live, their income, and more.

I know the context behind the person making the decisions, where they are, who they are with, their energies, whatever, and I can put other things into the mix.

I can know their attitudes, how they feel about the category, their behavior.

So imagine this kind of big data blob about a person. I'm going to oversimplify the science here, but we basically built an algorithm for statistical tournaments.

So stats tournaments are like asking questions about this big data. “Data, out of everything we know about consumers right now, what is the most useful information we should know to better understand what consumers need?”

Therefore, there are winners and losers in tournaments.

The winners are the variables or aspects that really tell us a lot about the consumer and what they need.

And we're missing a not-so-practical variable. This is important. Because in a world with limited resources, we don't want to waste resources on people who actually have the same needs.

So why treat them differently?

We know suspense doesn't kill people at this point. Because I told you what the results were. But what we discovered over time is after doing 200 projects around the world. It covers over 20 countries. Essentially, we've run about 100,000 of these tournaments. And, not surprisingly, gender has rarely been the most predictable in understanding consumer needs.

Of the 100,000 tournaments, only about 5 percent of them turned out to be a winning variable.

By the way, this is true all over the world.

I've done this where the traditional gender roles are a little more prominent, but the conclusion is exactly the same.

Gender was slightly more important than 5%, but not as important.

So let's think about it for a second.

No matter how you look at your consumers, they're probably more interested in other things than gender.

Perhaps there's something very important to know about them, but it's distracting because you base everything on their gender.

That's why I say you leave your money on the table.

Gender is easy. Designing ads based on gender is easy. It's also easy to target people online and on TV based on their gender.

But it's not where the exciting growth ultimately comes from.

For example, if you're a food company, it's actually much more interesting to know where people are eating, who they're eating with, and whether they're very nutritionally conscious.

All of this is actually much more powerful and useful than knowing if a person is male or female.

And it is of course important. Because if you want to make the most of your limited budget, it's better to create solutions for different occasions than to target women instead of young men.

Another example is alcoholic beverages.

In fact, women account for 35-40 percent of alcoholic beverage consumption worldwide, but as we all know, women don't drink beer.

These are the things we hear a lot.

But in reality, when men and women are in the same place, the emotional and functional needs they have in the moment are very similar.

By the way, there is one exception. There are exceptions. When a man and a woman date, there is some tension because the man is trying to impress the woman and the woman is trying to build a relationship with him, but it's important to know.

Financial Institutions: We hear a lot about the differences between men and women, but the truth is that talking about the differences between men and women distracts us from what lies at the root of it.

I made it very simple like "women don't like investing", "women hate managing money", "men are great, aggressive and risk takers", etc. But in the end it's not about men and women.

It's actually a different story.

There are people who are excited, full of energy, educated in financial management, and there are people who are not.

So if you shift the conversation from men and women to what's really down there, perhaps you might stop being so condescending towards women and actually start serving men who are shy about managing their money.

I'll leave you with one more example.

Going back to the women who played sports in the first place, one of the fascinating things I discovered when researching sportswear in different countries is that the needs of men and women are the same if you are an athlete and someone in a moment of activity.

Athletes are athletes.

Male or female, young or old, it doesn't matter. You're an athlete and you need this gear that works for you in moments of action or intense competition.

So these soccer player women have a lot in common with soccer players.

Off the field doesn't matter.

Outside the field, they may be interested in fashion or other things, but on the field the needs remain the same.

These are just a few of the categories that we have found that gender is not the best place to go, and really the argument is that it's not even a feminist push at this point, we've just gotten used to it.

We've grown accustomed to using gender, but it's important to start finding ways to measure other things about our consumers so we don't go back to gender.

I'm no naivety, and I know there's still an appetite and some ease with using gender, but at least this is worth discussing.

In business, I have to ask if this is really the best lens for me to grow.

So if you're a business person like me and you're always worried about what your role is in the broader social debate, if you're listening to your business and you hear something like, "Oh my target is women, my target is men and this applies to young girls, young boys," if it's a gender conversation, again, unless you're working in a very specific gender-specific product category, don't use this as a red flag. Please take it. Because if you keep talking like this, you're perpetuating stereotypes. Make people think men and women are different.

But this is a business, and we run a business and want to grow it, so we should at least challenge our own instincts to use gender. Because, according to statistics, you probably haven't chosen the best variables to target your product or service.

Growing up is never easy.

Why do you think entering a market with an outdated lens like gender will bring growth?

So let's stop doing the easy thing and aim for the right thing.

At this point, it's not just for your business, it's for society.

thank you.

(applause)

I want to talk about elections.

For the first time in the United States, a majority white voter group voted for an African-American presidential candidate.

And indeed, Barack Obama has done very well.

He won 375 electoral votes.

And he received nearly 70 million more popular votes than any presidential candidate of any race or party in history.

If you compare what Obama did to how John Kerry did four years ago -- Democrats love to see nearly every state get bluer and more democratic in this transition -- even the ones Obama lost, like the West, they got bluer.

South and Northeast, pretty much everywhere with a few exceptions.

One exception is Massachusetts.

It was John Kerry's home state.

Not surprisingly, Mr. Obama could not have done better there than Mr. Kelly.

Or in John McCain's home state of Arizona, Obama didn't do much better.

But there are also regions like the central region of the country.

Arkansas, Tennessee, Oklahoma, and West Virginia areas of this species.

Now, if you look at the last Democrat to actually win, Bill Clinton, for the first time in 96 years, you see a really big difference in this part of the country, like what I call the Appalachian Mountains, the Ozarks, the Highlands. Between Bill Clinton's '96 method and Obama's 2008 method, there is a 20 or 30 point variation.

Yes, Bill Clinton is from Arkansas, but those are very, very big differences.

Think about parts of the country like Arkansas.

There is a book called "What's the Problem in Kansas?"

But the real problem here is that Mr. Obama did relatively well in Kansas.

He lost hard, but so does any Democrat.

He didn't lose as badly as most people.

But what happened in Arkansas?

(Laughter) And when we think of Arkansas, we tend to have pretty negative connotations.

We think of rednecks with guns.

And we think people like this probably don't want to vote for people who look like this and have the name Barack Obama.

We think it's a race issue. And is this fair?

Are we kind of blaming people in Arkansas and this part of the country?

The answer is that it is at least partially fair.

We know race is a factor, and the reason we know that is because we asked those people.

We didn't actually ask them, but when they ran exit polls in every state, in 37 out of 50 states, we asked fairly direct questions about race.

they asked this question.

Did a candidate's race play a factor in deciding who to vote for president today?

What we're looking for are people who say, "Yes, race was a factor, and race was an important factor in my decision," and who voted for John McCain as a result of that factor, perhaps in combination with other factors, or alone.

We look for behavior like this among white voters, or indeed non-black voters.

When it comes to this question, we can see that there are significant differences in different regions of the country.

In Louisiana, about one in five white voters said, "Yes, one of the big reasons I voted against Barack Obama was because he was African American."

If even half of those people had voted for Obama, Obama would have won Louisiana safely.

I think the same is true for all these states high on the list.

On the other hand, in California or New York, you can say, "Oh, we're enlightened," but you know, the incidence is certainly much lower, and I think it's probably a manifestation of racially based voting.

Display the same data on a map.

I see the relationship in states where more people said, "Yes, Barack Obama's racism was a problem for me."

A comparison with the 1996 map reveals overlap.

This seems to explain just why Barack Obama was worse in this part of the country.

So we have to ask why.

Is racism predictable in some way?

What's driving this?

Is it just about strange things happening in Arkansas and Kentucky that we don't understand?

Or are there more systemic factors at work?

Therefore, different variables can be examined.

Economists and political scientists are always looking at things like income, religion, and education.

Which of the following appears to fuel the manifestation of racism in this massive nationwide experiment on November 4th?

Some of these have strong predictive relationships. One of them is education. The states with the lowest number of years of school per adult are shown in red, and you can see that parts of the country, like the Appalachian Mountains region, are less educated. it's just a fact.

And there we see a relationship with race-based voting patterns.

Another important variable is the type of region you live in.

In more rural states, even some states like New Hampshire and Maine, we see some of this race-based voting for Barack Obama.

So it's a combination of two factors: education and kind of neighbors. More on this later.

And states like Arkansas and Tennessee are both very rural and poorly educated.

Yes, racism is predictable.

These things are probably the most important among other variables, but they seem to predict it.

We're going to delve a little deeper into what we call general social surveys.

It is conducted biennially by the University of Chicago.

And they ask a series of very interesting questions.

In 2000, they asked a particularly interesting question about racial attitudes.

One simple question they asked was, "Are there people of different races living in your neighborhood?"

You'll find that different kinds of communities have very different results.

In urban areas, about 80% of people consider themselves neighbors of another race, but only about 30% in rural areas.

Perhaps because if you live on a farm, you may not have many neighbors.

But despite this, you don't have much interaction with people who are different from you.

So what we're going to do is divide the white people in the study into those who have black neighbors, which are actually of another race, and those who have only white neighbors.

When it comes to political attitudes, some variables do not differ significantly.

This was eight years ago, and some people were more Republican back then.

But if you look at Democrats and Republicans, it doesn't make much of a difference who your neighbor is.

And some questions about race, like affirmative action, which is kind of a political question, even a policy question about race, it doesn't make much of a difference here.

Frankly, affirmative action is not very popular with white voters.

But people who have black neighbors and people who live in single-racial neighborhoods actually feel the same way about it.

But if you dig a little deeper, and hopefully a little more personal, the question becomes, "Are you in favor of a law against interracial marriage?"

There is a big difference.

People without interracial neighbors are about twice as likely to oppose interracial marriages than those with neighbors.

Base it on who lives in your neighborhood.

And similarly, instead of 2000, they asked in the same survey in 1996, "Would you vote for a qualified black president?"

People who don't have African-American neighbors are much more likely to say, "That's going to be a problem for me."

In other words, it's not even about city or country.

It's about who you live with.

Racism is predictable. And it is predicted by your interaction with people who are different from you, people of other races.

So if you want to deal with this, the goal is to encourage interaction with people of other races.

I think you probably have some very obvious ideas on how to do it.

I'm a big fan of cities.

Especially with a city that is diverse, sustainable, and able to support people from different ethnic and income groups.

I think cities encourage networking and casual interactions more than they do on a daily basis.

But not everyone wants to live in a city, and certainly not a city like New York.

So you can think more about street grids and such.

This is the area where I grew up in East Lansing, Michigan.

This is a traditional Midwestern community, meaning there is a real grid.

There are real neighborhoods, real trees, and real streets to walk on.

And you interact a lot with your neighbors, people you like and people you don't know.

As a result, this community has become a very tolerant community. I don't think this is like Schaumburg, Illinois, where small homes have their own cul-de-sac, drive-thru Starbucks, etc.

In fact, this kind of urban design became more prevalent in the 1970s and 1980s, and I think it has something to do with the country becoming more conservative under Ronald Reagan.

But here's another idea we have in mind. It is an interuniversity exchange program that sends students from New York abroad.

But frankly, there are enough differences in the country right now that it might be possible to take a lot of kids from New York University and send them to study at the University of Arkansas for a semester, or vice versa. Do it at high school level.

There are literally people who go to school in Arkansas or Tennessee who may not actively and positively interact with people from other parts of the country or other racial groups.

I think part of the educational variables we talked about earlier is the networking experience you get when you go to college. There you can meet people you wouldn't otherwise interact with.

But the point is, this is all good news. Because when something is predictable, it's what I call designable.

Even if the problem is as pernicious and intractable as racism, we can start thinking of solutions to solve it.

Once you understand the root cause of behavior and where it appears and where it doesn't, you can start designing a solution to it.

That's all I want to say. thank you very much.

(applause)

So in 2016, I was asked to write a photo essay about the Flint, Michigan water crisis.

And it's been going on since 2014.

I accepted this request because I wanted to photograph three generations of women who face this crisis on a daily basis.

I was lucky enough to meet two of my best friends, artists, activists and poets Amber Hasan and Shea Cobb, who showed me around Flint.

School bus driver Shea Cobb, along with her mother, Renee, and 8-year-old daughter, Zion, were central figures in the photo-essay.

I relentlessly followed Shea's school bus route.

And when Shia wasn't driving the bus, I watched over Shion to see if she was studying.

I embedded myself in every intimate aspect of Sia's life.

When Sia took me to Zion's school, and I saw the fountain covered in signs that said, "Poisoned. Do not drink," I couldn't pick up my camera and snap a picture.

The fact that in America we have gone from fountains that say "For Whites Only" or "For Blacks Only" to today's fountains that say "Poisoned water, please don't drink" shook me from the bottom of my heart.

And somehow, is it allowed?

Flint residents are forced to drink, cook and bathe in bottled water, while paying the highest water bills in the nation for water infected with the deadly Legionella bacteria.

Going to Flint was a natural fit for me. Because growing up in my hometown of Braddock, Pennsylvania, industrial pollution and bacteria-contaminated water were all too familiar to me. There my mom and I were battling autoimmune diseases like cancer and lupus.

Our 14-year collaboration, The Concept of Family, grew out of our struggle to survive environmental racism, healthcare inequalities, deregulation and emissions from the U.S. Steel Company, and chemical emissions that have made Braddock the city with the highest asthma and infant mortality rates in the country.

From the Monongahela River to the Flint River, in the words of W.E.B. Du Bois: "The town and the whole valley have turned their backs on the river.

We have used it as a sewer, a drain, a place to dump our waste. ”

General Motors has been accused of dumping chemicals into the Flint River for decades.

When my photo essay, Flint is Family, was published in August 2016, it was published to remind America that while Flint is no longer front page news, the water crisis is far from over.

And, of course, I knew that my series of photos wasn't enough to bring peace to the people of Vehicle City.

Sia and I bonded over our mothers and grandmothers.

Amber and I bonded through our struggle with lupus.

Together we decided to stay in each other's lives and continue our creative endeavors.

In 2017, Shea and Amber co-founded The Sister Tour, an artist collective whose mission is to provide a safe space for Flint artists.

A year later, I had a solo exhibition, Flint is Family, here at Gavin Brown's Enterprise on West 127th Street in New York City.

As the audience approaches the façade of the building, they will see a 30-foot tall billboard.

The 30-foot tall sign consists of three large color negatives with the message "Water Is Life" spelled out on Nestlé water bottles by Sister Tour.

Nestlé, the world's largest water bottling company, pumps 400 gallons of water from Lake Michigan's aquifer every minute for virtually no cost.

The company also pumps millions of liters of water from indigenous reservations, who have no access to clean water.

This is a fundraiser print I used to raise money to send the Sister Tour to various venues to educate people about the ongoing crisis.

I also kept this in the public eye by creating countdown flags that will be hung at facilities around the country.

In June of this year, Amber emailed me news that the Michigan Attorney General had dropped all criminal charges in the Flint Water Crisis investigation. Eight state and city officials are facing charges as serious as manslaughter in the case.

We can no longer sit back and wait for the government to do its job.

Justice delayed, justice denied.

Five years later, we are still awaiting justice for the men, women, and children of Flint.

I asked Amber, "What can we do?"

She told me about a man she met in Puerto Rico named Moses West who invented a £26,000 atmospheric water generator.

Amber took Moses to an elected official in the city of Flint.

None of them seemed at all interested in bringing the machine to Flint for relief.

Amber had to transport a machine from a military base in Texas to Flint.

No one in Flint had that kind of money.

And at that point, I received the proceeds from my solo exhibition, Flint is a Family, and a generous matching grant from the Robert Rauschenberg Foundation, and decided to send it to Moses West.

This past July, Moses West and his atmospheric water generator arrived in Flint, Michigan, in North Saginaw between Marengo and Pulaski, and in fact are still operating there today.

Three miles from downtown, this community is deprived of access to schools, healthy groceries and clean water.

Socially, it is viewed as a violent and impoverished community.

But I see something completely different.

Moses, a veteran and ranger, was very clear about his water rescue mission to bring free clean water to the people of Flint.

Teach you how to use the machine, how to care for it, and most importantly, take ownership of it.

Tell everyone in town to bring all their containers and come buy as much water as possible, especially before winter sets in. Machines will not extract moisture in sub-zero temperatures.

This technology draws air through a high-capacity air filter.

It creates mechanical condensation and produces 2,000 gallons of water per day.

Residents are free to walk to the machine anywhere between 9am and 8pm every day and drink as much as they want, eliminating the need to wait in long lines for bottled water.

I was in front of the machine and interviewed people and asked, "What does it mean to see Moses and his machine in [your] community?"

And, "What was life like without access to clean water?"

Arita told me, "It is a miracle that God gave Moses the knowledge and skill to provide us with pure drinking water."

She also said that before the machine came, she had a terrible headache, and the water made her stomach hurt and she couldn't eat.

Tina said the lead-contaminated water had caused her hair to fall out.

Usually she is weak and very dizzy.

She has more energy and strength since using this machine.

David, he was so happy that someone from Texas cared for him.

When he tasted the water, he thought, "This is what God intended water to be."

He brings three 7-gallon containers to refill for use on his BBQ stand.

Amber Hasan, Shia Cobb, Toukrol Senegal, Sister Tour, me, the people of Flint, Dexter Moon, Moses West and his atmospheric water generator were able to provide 120,000 gallons of free clean water through creativity and solidarity.

(Applause.) The people of Flint have a right to clean water.

Water is life.

It is the spirit that binds us from disease, death and destruction.

Imagine how many millions of lives could be saved if Moses' machines were installed in places like Newark, New Jersey, South Africa, and India out of mercy, not profit.

When Sia and Zion went for their first clean glass of water, I set up my camera, locked the focus, and put my finger on the shutter button.

When the shutter clicked, I was overwhelmed with a deep sense of joy and justice.

When I sent Sia some photos, she wrote, "Thank you again for the light you bring to my city."

I immediately replied, "The light was already in you."

Four years after I started photographing with Flint, I was finally able to do some poetic justice.

Even in the darkest conditions, the camera can extract light and turn negatives into positives.

thank you.

(applause)

Like many teachers, I lead a kind of icebreaker activity with my students on the first day of school each year.

I teach at Lincoln High School in Lincoln, Nebraska, one of the oldest and most diverse high schools in the state.

Also, to our knowledge, our school is the only high school in the world with a Lynx mascot.

like a chain

(Laughter.) And that's our mascot, and there's a statue in front of our building with four links chained together.

And each link has some meaning.

Our links symbolize tradition, excellence, unity and diversity.

So on the first day of school, I teach new 9th graders about the meaning behind those connections and give each of them a piece of paper.

Have them write something about themselves on the paper.

It can be anything they love, something they want, something that represents their identity.

Then walk around the room with a stapler and staple each of those slips together to form a chain.

We hang the chain in our classrooms as decorations, but also as a reminder that we are all connected.

We are all links.

But what if one of those links feels weak?

And what if that weakness is in the one with the stapler?

The person who is supposed to make those connections.

gentlemen.

As teachers, we work every day to provide social, emotional and academic support to students who come with diverse and challenging circumstances.

Like most teachers, my students go home each day and sit around the kitchen table while one or both parents prepare healthy, balanced meals.

They spend their dinner time summarizing the stories they read in 9th grade English that day and explaining how Newton's laws of motion work.

However, some students attend homeless shelters and group homes.

They go to the car where the family is now sleeping.

They come to school with their trauma, but when I come home every day, it goes home with them.

And that is the hard part of teaching.

It's not grading, lesson planning, or meetings, but it certainly takes teachers a lot of time and energy.

The difficulty with teaching is that it is out of your control and you cannot change it once you leave home.

So has it been like this all along?

It reminds me of my undergraduate training at the University of Georgia. There, in a method class, I was taught that the concept of a good education had changed.

We are not training learners for the purpose of working as workers on a factory line.

Rather, we are sending our children out as a workforce who need to be able to communicate, collaborate, and solve problems.

And it has transformed the teacher-student relationship into one that is stronger than that of content providers and knowledge receivers.

Lectures and silent sitting in lines are no longer enough.

We need to build relationships with our students and among them so that they feel connected in a world that depends on them.

I remember my second year as a teacher.

I had a student who I called "David".

And I remember feeling like I did a pretty good job that year in terms of teaching. "Hey, I'm not a first grade teacher.

I know what I'm doing ”

And it was the last day of school, I told David to have a great summer.

And I saw him walking down the hallway and thought I didn't even know what his voice sounded like.

And that's when I realized I was doing it wrong.

So I changed almost all of my teaching methods.

I created many opportunities for my students to talk to me, talk to each other, share their writings, and verbalize their learning.

And through those conversations, I not only got to know their voices, but I got to know their pain as well.

The following year, I brought David back to class, only to find out that his father had been deported for illegal immigration.

He started acting in school because all his family wanted was to be together again.

In many ways, I felt his pain.

And I needed someone to listen, someone to help me support him on things I didn't understand.

We also recognize the need for police officers who witness gruesome crime scenes and nurses who lose patients.

But for educational professionals, that urgency has lagged behind.

I believe that convenient and affordable access to mental wellness support is of paramount importance to students, teachers, administrators, paraprofessionals and all other support staff.

Consistently serving 25 to 125 students each day keeps our emotional piggy bank tapped.

After a while, it may become so depleted that it can no longer be tolerated.

They call this “secondary trauma” or “compassion fatigue,” the concept that we absorb the trauma our students share every day.

And after a while our soul becomes burdened with all that weight.

The Buffett Institute at the University of Nebraska recently found that most teachers (86% of all early childhood education settings) experienced some depressive symptoms in the previous week.

They found that about 1 in 10 reported clinically significant depressive symptoms.

From my interactions with colleagues and my own experience, I feel this is a common struggle for all grade levels.

So what are we missing?

What do we allow to break the chains and how do we mend them?

In my career so far, I have experienced the suicide deaths of two students and one wonderful teacher who loved children. Countless students experiencing homelessness. And children in and out of the justice system.

When something like this happens, it's customary to say, "If you need someone to talk to...".

And I say that's not enough.

i am very lucky

I work at a great school with great leadership.

I serve a large district that has many healthy partnerships with local agencies.

They have steadily increased the number of school counselors, therapists and support staff available to assist our students.

As part of our hiring plans, we also provide our staff with access to free counseling.

However, many smaller districts, and even some larger districts, cannot meet their living expenses without assistance.

(Exhaling) Every school needs not only social and emotional support staff, trained professionals who can handle the needs of the building, but not just students, not only teachers, but both. We also need trained professionals who intentionally seek out and contact those closest to the trauma.

Many schools are doing everything they can to close the gap, starting with recognizing that the work we are doing is really hard.

Another school in Lincoln, Suku Middle School, is doing what it calls "Wellness Wednesdays."

They invite community yoga teachers, sponsor neighborhood walks at lunchtime, and organize social events aimed at bringing people together.

Zachary Elementary School in Zachary, Louisiana, has what it calls a "midweek meetup," where teachers are invited to lunch and discuss what's going well and what's weighing heavily on their minds.

These schools are creating spaces for important conversations.

Finally, my friend and colleague Jenn Highstreet spends five minutes each day writing letters of encouragement to her coworkers, telling them of their hard work and sharing their hearts with others.

She knows that five minutes can have a valuable and powerful ripple effect across the school.

The chains that hang in my classroom are more than decorations.

Those connections haunt us for four years as students walk the corridors.

And every year I have seniors come back to my classroom, room 340, and they still point out where their links are.

They remember what they wrote there.

They feel connected and supported.

And they have hope.

Isn't that what we all need?

Someone please reach out and make sure we are all right.

To check in on us and remind us that we are the Link.

Sometimes you just need a little help holding a stapler.

thank you.

(applause)

You know that little pink thing in the corner of your eye?

Actually, this is a remnant of the third eyelid.

Known as the "half-moon phantom," this structure is more prominent in birds and some mammals and acts like a windshield wiper to keep dust and debris out of your eyes.

But that is not the case with humans.

It is a vestige, meaning it no longer serves its original purpose.

There are several other vestigial structures such as half-moon folds in the human body.

Most of these were leftovers long before Homo sapiens existed, silently passed from one species to the next.

But why are they staying so long?

To answer this question, it helps to understand natural selection.

Natural selection simply means that traits that help an organism survive and reproduce in a particular environment are more likely to be passed on to the next generation.

When the environment changes, traits that were once useful can become harmful.

These traits are often not selected, meaning they fade away from the population.

However, if a trait is not positively harmful, it may remain unselected even though it is useless.

Take the tailbone.

Evolutionary biologists believe that our tailed ancestors left trees and began walking on land when the climate dried up and grasslands appeared.

The tail, which had helped me in the trees, began to interfere with my ability to walk on land.

As such, individuals with mutations that shortened tail length became more successful on land and survived long enough to pass their short tails on to the next generation.

This change probably occurred gradually over millions of years, with the complete disappearance of our ancestor's outer tail about 20 million years ago.

We now know that human fetuses have tails that dissolve as they grow.

The stocky tailbone, however, remains there, presumably because it does no harm. In fact, the coccyx serves a more minor function as an anchor point for certain other muscles.

Up to 85% of people have a vestigial muscle called the 'palalis longus'. To check if this is the case, place your hand on a flat surface and let your little finger touch your thumb.

If you see a small raised band in the middle of your wrist, it's the tendon that attaches to this now-defunct muscle.

In this case, the fact that not everyone has it helped us track down that feature.

A trace trait may persist if there is no incentive to lose it, but there is also no incentive to maintain it, so random mutation may still eliminate it from part of the population.

If we look at our primate relatives, we find that long palms are sometimes absent in animals that spend more time on land, but are always present in those that spend more time in trees.

So it's possible that they were once useful for moving from branch to branch and were no longer needed once they landed.

On the other hand, it is possible that the appendix was once part of the intestinal system that our ancestors used to digest plant material.

As their diet changed, these parts of the intestinal system began to shrink.

However, unlike other vestigial structures, the appendix is ​​not always harmless and can become dangerously inflamed.

For most of human history, a ruptured appendix could amount to a death sentence.

So why did it take root?

It's possible that it was disappearing very slowly, or that there simply weren't any mutations that made it smaller.

Alternatively, there may be other benefits. For example, it could be a reservoir for bacteria that help break down food.

But the truth is, I don't quite understand why the appendix survives.

Evolution is an imperfect process.

Humans are the result of millions of years of trial and error and chance, and we are filled with evolutionary artifacts that remind us of that.

Who among these three is doing something dangerous?

Anyone taking cholesterol meds with grapefruit juice?

Does anyone take acetaminophen painkillers for ankle pain before going out for drinks?

Or are you on blood thinners and taking aspirin for headaches?

In fact they are all.

Each can inadvertently cause drug interactions and, in extreme cases, kidney failure. Liver pain; internal bleeding.

Drug interactions occur when the combination of a drug and another substance causes a different effect alone.

Foods, herbal supplements, legal drugs, and illegal substances can all cause drug interactions.

Most drug interactions fall into two categories.

Some occur when the effects of two substances directly influence each other.

Also, one substance can affect the way the body processes another, including absorption, metabolism, and transport within the body.

For example, blood thinners and aspirin have similar effects and are dangerous when combined.

Both prevent the formation of blood clots. Anticoagulants prevent the formation of clotting factors that hold blood clots together, and aspirin prevents blood cells from clumping together and forming clots.

These effects are usually safe on their own, but when combined they can prevent blood from clotting to a dangerous degree and cause internal bleeding.

Anticoagulants and aspirin are generally harmless when taken individually, but interactions where one substance exacerbates the effects of another can also occur between drugs that are independently harmful.

Cocaine and heroin are each dangerous, and even though their behavioral effects seem to cancel each other out, combining the two drugs makes them even more dangerous.

Cocaine is a stimulant and many of its effects, such as increased heart rate, cause the body to need more oxygen.

But heroin, a depressant, slows breathing and reduces oxygen supply when the body needs more.

This combination can strain organs and cause respiratory failure and death.

Interactions between grapefruit juice and certain drugs, a class of cholesterol-lowering drugs called statins, have been implicated in drug metabolism.

The liver produces enzymes, molecules that facilitate the breakdown of substances that enter the body.

Enzymes can activate drugs by breaking down more complex molecules into their therapeutic components, or they can inactivate drugs by breaking down harmful compounds into harmless metabolites.

There are a great many different enzymes, each with binding sites that fit a particular molecule.

Grapefruit binds to the same enzymes as statins, leaving less enzyme available to break down statins.

Combining the two therefore means that higher concentrations of the drug remain in the bloodstream for longer and can lead to kidney failure.

Alcohol can also alter the function of enzymes that break down acetaminophen, the active ingredient in pain relievers such as Tylenol and paracetamol.

When someone ingests acetaminophen, some of it is converted into toxic substances.

At recommended doses, there are usually not enough of these toxic by-products to cause harm.

However, heavy drinking can alter enzyme activity and produce more of its byproducts, which can cause liver damage even at normally safe doses of acetaminophen.

On the other hand, the herbal remedy St. John's wort increases the production of certain enzymes by the liver.

This means that the drugs that this enzyme degrades are metabolized more quickly, and sometimes too quickly, before they have a therapeutic effect.

Despite the myriad of possible interactions, most of the dangerous interactions with commonly used drugs are well known.

And new developments in science are making it possible to track drug interactions more precisely than ever before.

Some researchers are developing AI programs that can use information about the state of protein interactions in the body to predict the side effects of drug interactions before they occur.

For new drugs that are constantly being developed, supercomputers are used to find potential interactions while those drugs are still in development.

In February 2013 my wife and I moved to Singapore.

At exactly the same time, Uber announced that it had begun operations in the country.

Well, my wife and I agree on many things, but using Uber definitely wasn't one of them.

While I was excited about the technology and perhaps we wouldn't have to own cars anymore, she felt that all Uber cars were here to take the jobs of taxi drivers.

And Sarah wasn't the only one.

As Uber, Airbnb and Amazon -- the so-called "online marketplaces" -- began to expand their presence around the world, I've heard countless policymakers worry about how to deal with the new risks of job destruction, falling wages and tax leaks.

We also heard from business leaders who fear that fierce competition from global platforms will eat away at their local businesses.

And on a reasonable level, of course I understand.

After all, this is basic supply and demand economics.

In any market, a significant increase in supply is expected to lower prices, profitability and growth rates for incumbent players.

But my personal experience has also seen the other side of the story.

Online marketplaces like Gojek in Indonesia and Jumia in Africa have helped the business ecosystem and surrounding communities.

The female taxi drivers I have seen in Egypt show a positive side of having the opportunity to work without the harassment they face in the taxi industry.

A Kenyan village has revitalized its economy, demonstrating just that, as a beautiful but largely unknown lake nearby is now becoming a national ecotourism hotspot.

Online marketplaces will continue to grow.

And they will change the way we shop, travel, and transact with each other.

So we really need to understand where the truth is in these two stories.

Should we expect more of the bright side, or more of the dark and disturbing side?

And is there a way to get the 1st without getting the 2nd?

I think there is.

I am a business researcher as a strategy consultant.

And as a mathematician at heart, I couldn't accept that there is something and the opposite is equally true.

So I went back to basics and asked the question, "What do online marketplaces actually do?"

what do they do?

Well, they are essentially doing something very simple.

They match sellers and buyers.

that's it.

Drivers and passengers can use Uber and Grab in Southeast Asia and DiDi in China.

Amazon, Alibaba, or Jumia can be used in Africa to match sellers and consumers.

And you can use Airbnb for housing. Kickstarter is available for funding. The list goes on.

What all these examples have in common is the shift of the basic function of matching sellers and buyers from the physical world to the digital world.

That way, you can find better matches, execute faster, and ultimately extract more value for everyone.

In fact, the main advantage of online marketplaces is that you get more for the same amount of effort.

For example, if you're a taxi driver in San Francisco and you decide to work 10 hours a day, you're actually paying to take passengers 4 of those 10 hours.

If you put the same vehicle on a platform like Uber, you can pay an additional hour and a half to carry passengers.

This means that the same car is 40% more productive.

And the same is proving to be true for other online marketplaces as well.

By design, they create more value for the economy.

Now we need to figure out who gets this extra value.

You can give it to drivers - more passengers, more income.

If the price is lowered, it can be offered to the consumer.

Alternatively, the platform may decide to keep everything.

What usually happens is that all three split it up in some way.

But what about the rest of us?

We can be affected no matter which side of this business we are on.

If my neighbor decides to rent an apartment on Airbnb, and more people walk in and out of the building, and more noise than usual, the unpleasant side effects of this productivity magic befall me.

This is what economists call “negative externalities”.

In New York, for example, taxi drivers find their licenses devalued by as much as 30 percent due to the negative externalities of Uber's increased productivity.

This is the dark side.

And this leads to street demonstrations and sometimes violence.

I strongly believe this can be avoided.

And the more time we spent in emerging markets, the more clear that became.

In fact, during my stay in Singapore, I spent half of the week traveling between Malaysia, Thailand and Indonesia and became a user, indeed a fan, of the then little-known online marketplace.

However, some of them have made interesting strategic trade-offs that dramatically reduce side effects and externalities.

Take Gojek for example.

It's basically Uber for bikes.

They are one of the most popular online marketplaces in Indonesia and this has a lot to do with the role they choose to play.

Rather than competing with all other modes of transport, we chose to gradually integrate them within our own platform, so we can now check public transport schedules and choose to take long-distance buses without leaving the Gojek app.

Then there are motorbikes and traditional taxis that can be ordered and paid within the same app.

Looking at Gojek today, 9 out of 10 former motor taxi drivers believe their quality of life has improved since joining the platform.

And 9 out of 10 consumers, or 9 out of 10, believe Gojek has a positive impact on society at large.

Today, this level of trust has allowed Gojek to grow into a super online marketplace for everything from food to groceries to massage and laundry pickup today.

It all came out of a deliberate trade-off in ultimately becoming the orchestrator of a larger ecosystem, where others also play a role, rather than the single winner who ultimately hogs the small pie: the hero.

Another interesting example is Jumia.

Jumia is the Amazon equivalent of Africa.

But it doesn't provoke the same level of fear in the small business community.

One of the reasons is our decision to invest aggressively in growing African entrepreneurs into the digital age.

Note that Jumia operates in a country with the lowest digital literacy and digital connectivity scores in the world.

While they could and probably have addressed this issue in the usual way through lobbying for reform, they also built Jumia University, an e-learning platform where retailers can learn basic digital and business skills.

We surveyed online marketplaces in Africa last year.

And during that investigation, we met one of Jumia's merchants.

His name is Jomo.

He was laid off from his job in 2014, when he decided he wanted to be the boss.

he wanted to be independent.

He also hoped never to be fired again.

So Jomo had no idea what the business was at the time.

As such, I had to undergo a series of trainings to learn how to select products, set prices, and promote them online.

Today, Jomo has an online business with 10 employees.

And as of a few months ago, he just opened his first brick-and-mortar store outside Nairobi.

Today, Jumia has the potential to help a huge number of Jomos people through its university.

And combined with the continent's other online markets, we estimate it could create another 3 million jobs by 2025.

And they will do it either directly or through their wider community influence.

And in some cases, the platform can make the difference between success and failure by considering or ignoring its far-reaching impact.

To explain it, let's go back to Singapore.

So when my wife and I decided to move out of the country last year, Uber decided to do the same.

At the same time, we started seeing that pattern again, but perhaps it was a coincidence.

In fact, Uber lost out on the ride-hailing race to Malaysian-born startup Grab.

Now, interestingly, my wife didn't have the same level of concern for Grab. Because when Grab started, Grab had a different name.

It's called MyTeksi and, as the name suggests, it started out as a taxi platform.

So when Grab started expanding its driver pool beyond taxis, it was seen as gradual and reasonable.

They were also very careful in doing so.

They thought what kind of social safety net should be provided for all drivers.

Therefore, they have introduced special insurance packages and even financial education programs.

Now compare this with what happened in London, New York and Paris. There, taxi drivers felt the platform didn't understand that they had to pay €200,000 to get their license - mostly on loan.

If such social environment information is not considered, a strong backlash will occur.

I do not claim that the trade-offs made by Grab, Jumia and Gojek are risk free.

Was there a temporary slowdown in growth at some point?

perhaps.

But look at them today.

Gojek is worth $10 billion.

Jumia is one of only three unicorns in all of Africa.

And Grab kicked out Uber across Southeast Asia.

I also don't think these tradeoffs are unique to emerging markets.

Amazon, Uber, and others can learn from it and adapt to their own realities.

In the long run, this doesn't have to be a zero-sum game.

In the long run, and maybe this is my opinion from the Asian side, it's important to be patient.

Of course, it's beneficial to revisit your goals and priorities in the light of the larger equation, which includes not only you and your users, but also regulators, policymakers, and communities.

And most of all, I would argue that includes the very business you are trying to destroy.

thank you.

(applause)

So I am here to tell you about Africa's success stories.

A year and a half ago, four of the five full-time members of Ushahidi, which means "testimony" in Swahili, were TED Fellows.

A year ago, Kenya experienced violence after elections.

During that time, we prototyped and built a system in about three days that allowed anyone with a mobile phone to send information and reports about what was going on around them.

We started from there with what we know about Africa, our default device, our mobile phone, as a common denominator.

We have received such reports.

This is just a small part of last January 17th.

And our system was rudimentary. It was so basic.

It's a mashup using data collected from people and put it on a map.

But then we decided we needed to do something more.

We had to take what we had built and create a platform that could be used elsewhere in the world.

And teams of developers from across Africa, including Ghana, Malawi and Kenya, are now part of this team.

Some are from America.

We are developing for smartphones so that it can be used in developed as well as developing countries.

We recognize this to be true.

If it works in Africa, it will work everywhere.

So we will first build for it in Africa and then move to the edge.

Currently deployed in the Democratic Republic of the Congo.

It is used by NGOs across East Africa, with smaller NGOs doing their own small projects.

It was deployed to Gaza by Al Jazeera just last month.

But that's not really what I want to talk about here.

I'm here to talk about the next big thing. Because we know we have the ability to report eyewitness accounts of what is happening in real time.

We've seen this at events like Mumbai lately, but it's now much easier to report than to consume.

There is a lot of information. What is your occupation?

This is a 3+ day Twitter report covering only Mumbai.

How do you decide what's important?

How believable is what you're seeing?

What we discovered is that there is a lot of useless crisis information because there is too much information to really do anything about at the moment.

And it's those first three hours that we're actually really concerned about.

Focus on the first three hours.

How do we deal with incoming information?

I can't figure out what's actually going on.

On earth and around the world, people are still curious and trying to figure out what's going on. But they don't know.

Of course, what Ushahidi has built is crowdsourcing this information.

You can also see this on Twitter. This information can be overkill.

So you have a lot of information. That is wonderful.

But what about now?

So I think we can do something interesting here.

And we have a small team working on this.

I think you can actually create a filter by crowdsourcing.

Take the crowd and apply it to the information.

And by evaluating it and evaluating different people sending the information, you can get refined and weighted results.

So it gives us a deeper understanding of the probability that something is true or not.

This is, frankly, an innovation from Africa. It's innovations like this that are interesting.

It comes from unexpected places.

By young and smart developers.

And it's the community around it that decided to build this.

Thank you very much.

And we are very happy to be part of the TED family.

(applause)

Many of us here use technology on a daily basis.

And some of us rely on technology to do our jobs.

For a while, I thought of machines and the technology that powers them as the perfect tools to make work more efficient and productive.

But with the rise of automation in so many different industries, I wondered: What will happen to human hands when machines can do the work traditionally done by humans?

How do our desires for perfection, precision, and automation affect our creativity?

In my work as an artist and researcher, I study AI and robotics to develop new processes for human creativity.

Over the last few years, I have worked alongside machines, data and emerging technologies.

It is part of a lifelong fascination with the dynamics of individuals and systems and all the turmoil that entails.

I thus explore questions about where AI ends and where it begins, and where it develops processes to explore potential sensory combinations of the future.

I think that's where philosophy and technology intersect.

I learned a few things by doing this job.

It taught me that embracing imperfection actually teaches me something about myself.

I was taught that exploring art helps shape the technology that actually shapes us.

And I've found that combining AI and robotics with traditional forms of creativity (in my case, visual arts) helps us think a little bit more deeply about what it means to be human and what it means to be a machine.

And we came to the realization that collaboration is the key to creating space for both as we move forward.

It all started with a simple experiment with a machine called "Drawing Manipulation Unit: Generation 1".

I call this machine "D.O.U.G". For short.

I knew nothing about building robots until I built D.O.U.G.

I have adapted several open source robotic arm designs and hacked a system where the robot matches my gestures and follows them in real time.

The premise was simple. I would lead and follow.

I drew a line and it mimicked my line.

Back in 2015, we painted for the first time in front of a small audience in New York City.

The process was rather sparse, with no light, no sound, and nothing to hide behind.

It's just that my palms are sweaty and the robot's new servos are hot.

(Laughter) Obviously, we weren't made for this.

But something interesting happened that I didn't expect.

See, the D.O.U.G. in primitive form didn't track my line perfectly.

While the on-screen simulation was pixel perfect, physical reality is a different story.

Slipping and sliding, stuttering and stuttering, I had to deal with it.

There was nothing primitive there.

Yet somehow the mistakes made the piece more interesting.

The machine was interpreting my lines, but it wasn't perfect.

And I had no choice but to comply.

We were adjusting to each other in real time.

And watching this, I learned a few things.

Turns out our mistakes actually made the piece more interesting.

And I realized that the machine's imperfections make our imperfections the beauty of interaction.

And I was thrilled. This has led to the realization that part of the beauty of human-machine systems may be the inherent potential for error they share.

For the second generation of D.O.U.G., we wanted to explore this idea.

But instead of pushing a robotic arm to its limits causing an accident, I wanted to design a system that reacted to my drawings in unexpected ways.

We used visual algorithms to extract visual information from decades of digital and analog drawings.

These drawings trained a neural network to generate recurring patterns in the work, which were sent back to the machine via custom software.

I painstakingly collected as many drawings as I could find—finished works, unfinished experiments, random sketches—and tagged them for the AI ​​system.

And I'm an artist, so I've been making works for over 20 years.

It took months to collect that many drawings, and it was hard work.

Training an AI system is actually a very difficult task.

A lot of work is going on behind the scenes.

But as I worked, I learned a little more about how AI architectures are built.

Then I realized that it wasn't just neural network models and classifiers.

But it's basically a flexible, shape-shifting system, and there's always a human hand in it.

It is far from the omnipotent AI we have been told to believe.

So I collected these drawings for my neural network.

And we have achieved what was previously impossible.

My Robot D.O.U.G. has become a real-time, interactive reflection of the work I've done throughout my life.

The data were personal, but the results were strong.

And I got really excited. Because I began to think that machines need not be mere tools, but could act as non-human allies.

And more than that, I think that perhaps the future of human creativity lies not in what we make, but in how it comes together and explores new ways of making things.

So if D.O.U.G.\_1 is the muscle, D.O.U.G.\_2 is the brain, then I would like to think of D.O.U.G.\_3 as the family.

I wanted to explore the idea of ​​human-non-human collaboration on a large scale.

So, over the past few months, I've been working with my team to develop 20 custom robots that can work collectively.

They work as a group and together we work across New York City.

I was really inspired by Stanford University researcher Feifei Li, who said, "If you want to teach a machine how to think, you first need to teach it how to see."

It reminded me of the last ten years I spent in New York and how I was being watched by surveillance cameras all over the city.

And I thought it would be very interesting if I could use them to teach a robot to see.

So for this project, I started thinking about the line of sight of the machine, thinking about vision as multidimensional, as a view from somewhere.

We collected videos of people walking on sidewalks, cars and taxis on roads, and all kinds of urban movement from camera feeds available on the Internet.

We trained vision algorithms on these feeds based on a technique called "optical flow" to analyze the collective density, direction, dwell, and speed states of urban movement.

Our system extracted these states from the feed as positional data and became pads for the robotic unit to draw on.

Instead of one-to-one collaboration, we now have many-to-many collaboration.

Combining human and machine visions in the city, we have reimagined what landscape painting can be.

Through all our experiments with D.O.U.G., no two performed the same.

And through collaboration, we create what neither of us could do alone. We explore the boundaries of creativity, working side-by-side with humans and non-humans.

I think this is just the beginning.

This year I launched Scilicet, a new lab exploring human-to-human collaboration.

We are very interested in feedback loops between individual systems, man-made systems and ecosystems.

We combine human and machine output with biometrics and other types of environmental data.

We invite anyone interested in the future of work, systems, and human collaboration to explore with us.

We know we all have a role to play, not just techies who have to do this work.

We believe that by teaching machines how to do tasks traditionally done by humans, we can explore and evolve the standards of what is possible with the human hand.

And part of that journey is embracing imperfections and recognizing the mistakes of both humans and machines in order to expand human and machine potential.

I still pursue the beauty of human and non-human creativity.

I don't know what the future holds, but I am very interested.

thank you.

(applause)

I will read some short stories.

These are mostly from a monthly page I run and an architecture and design magazine called Metropolis.

And the first story is called "The Faulty Switch".

Another beautifully designed new building was also marred by the familiar noise of wall light switches.

During the day when the sun shines into the main room it's fine.

But at dusk everything changes.

Architects spent hundreds of hours designing polished brass switchplates for the new office tower.

And we left it up to the contractor to install those 79-cent switches in the back.

We instinctively know where to go when we enter a dark room.

Automatically throws small blobs of plastic upwards.

But the sounds we are greeted with as the room is illuminated by the pseudo-glow of late afternoon light reminds us of the dirty men's quarters behind a Greek coffee shop.

(Laughter) This sound colors our first impression in any room. it can't be helped.

But where does this sound, commonly described as a click, come from?

Is it just a by-product of crude mechanical action?

Or is it an imitation of half the sounds we make to express our disappointment?

Often dental sounds not found in Indo-European languages.

Or is it the amplified sound of synapses firing in the cockroach's brain?

In the 1950s they did their best to drown out this sound using mercury switches and silent knob controls.

Today, however, these improvements seem somewhat unreal.

The click is the modern-day triumphant clarion that propels us forward in life, heralding entry into any room without light.

The sound of turning off a wall switch is of a completely different nature.

It has a deep melancholy sound.

Children don't like it.

That's why we leave the lights around the house on. (Laughter) Adults find it comfortable.

But wouldn't it be easier to wire a wall switch to sound the silent honking of a steamboat?

Or is it a recorded rooster crowing?

Or distant thunder?

Thomas Edison considered thousands of improbable materials before finding the perfect material for the filament of a light bulb.

Why did we get used to the sound of that switch so quickly?

That's it.

(Applause.) The next talk is entitled "Honor the Taxpayer."

That so many of the city's most respected taxpayers have once again weathered the commercial building boom is something to celebrate.

These one- or two-story buildings were designed to generate only enough income to cover taxes on their land and were not intended as permanent buildings.

For some reason, however, it has thwarted the efforts of developers to organize sites suitable for high-rise construction.

They make no claim to architectural beauty, but because they are entirely temporary, they are a great alternative to the larger structures that may one day replace them.

The most perfect examples are in corner lots.

Provides a comfortable rest away from the surrounding dense development.

Breaks between light and air, architecture that marks the passage of time.

These buildings are so buried in signage that it often takes time to distinguish between a modern specially constructed taxpayer and the taxpayer next door. A small 1st-century commercial building, its upper floors are hermetically sealed, and its ground floor space now serves as a tax payer.

The few surfaces not covered by signs are often covered with a characteristic dark greenish-grey striped aluminum siding.

Take-out sandwich shops, film developing stations, peep shows, necktie shops, and more.

Today, these temporary structures have remained intact for most of human life, in some cases.

Temporary buildings are a triumph of modern industrial organization, a healthy sublimation of the urge to build, proving that every architectural idea need not be fixed.

That's it.

(Laughter) And the next story is called "On Man's Knees."

For the ancient Egyptians, the knee was the platform on which the dead's earthly possessions rested, measuring 30 cubits from foot to knee.

It was not until the 14th century that an Italian painter recognized this wrap as a Greek temple decorated with flesh and cloth.

Over the next 200 years we see the Infant Christ transition from sitting to standing and back again on the lap of Our Lady.

All children repeat this ascension by straddling one or both legs, sitting on their side, or leaning against their body.

From there to the modern-day ventriloquist's dummy is just a fraction of a second in history.

You were late for school again this morning.

The ventriloquist must first convince you that a little boy is sitting on your lap.

An audio illusion follows incidentally.

Jimmy, do you have anything to say to yourself?

As adults, we yearn for that rap from a nostalgic distance.

The memory of the temporary temple built every time an adult sat down is fading.

On a crowded bus, we always had to sit on the lap.

Children and teenage girls are most acutely aware of its architectural beauty.

They appreciate the structural integrity of deep sutureless wraps compared to the precarious placement of neurotic nieces in high heels.

The relationship between rap and its owner is direct and intimate.

I am envisioning a 36-story, 450-unit high-rise residential building. That is why the mental health of an architect should be considered before commissioning important work.

Of course, there are no windows in the bathroom or kitchen.

The wrap of luxury is the architectural construct of childhood, and as adults we vainly try to adopt it.

That's it.

(Laughter) The next story is called "The Harbor Peace Collection." Momentarily visible from the northbound lane of the Plixko Motorway, an unremarkable warehouse serves as a temporary resting place for the Harbourpiece collection of European dried fruit.

Deep unevenness on the surface of dried cherries.

The radiance that makes you feel the oversized dates.

Remember wandering through dark wooden storefront galleries as a kid?

Where everything was displayed in unlabeled, cockroach-proof boxes.

Dried pears in the form of genitalia.

The apricot is split in half like a cherub's ear.

In 1962, unsold stock was purchased by wealthy prune juice bottler Maurice Haverpiece and combined to form the core collection.

As an art form, it falls somewhere between still life and plumbing.

After his death in 1967, a quarter of the product was sold as compote to a luxury hotel restaurant.

(laughter) Unsuspecting guests were served turn-of-the-century Turkish fig stew for breakfast.

(Laughter) The rest of the collection will remain here, stored in plain brown paper bags until funds are collected to build a permanent museum and learning center.

Shoes made of apricot leather made for the emperor's daughter.

That's it. thank you.

(applause)

Asgard, the kingdom of wonders, was the home of the Norse gods.

There, the Great Hall of Odin's Valhalla towered over the mountain and anchored Bifrost, the Rainbow Bridge.

But while their realm was grand, it was defenseless against the giants and trolls of Jotunheim, who despised the gods and sought to destroy them.

One day, when Thor, the mightiest of the gods, was fighting these enemies, a stranger appeared on a mighty gray horse.

A visitor made an amazing offer to the gods.

He built them the greatest wall they had ever seen, taller than any giant could climb, stronger than any troll could break.

All he asked in return was the marriage hand of the beautiful goddess Freya, and the sun and moon from the sky.

The gods hesitated at this request and tried to get rid of him.

But the trickster Loki has an evil plan.

He told the gods to accept this stranger's offer, but set conditions so severe that the wall could not be completed in time.

That way they can build most of the wall for free without losing anything.

Freya didn't like the idea at all, but Odin and the other gods were persuaded and came to an agreement with the builders.

It took only one winter to complete the walls.

No payment will be accepted if any part is not completed by the first day of summer.

And he couldn't get help from other people.

The gods made a pact with solemn oaths, vowing not to harm masons in Asgard.

In the morning the stranger began digging the foundations with astonishing speed, and at night set off for the mountains to get the building stones.

But it was only when they saw him return the next morning that the gods began to worry.

Others were not helping the masons, as agreed.

But his horse, Svadilfari, was carrying a load of stones so huge that it left a ditch in the ground behind him.

Winter came and went.

Strangers continued to build, Svadirfari continued to carry, and neither snow nor rain could slow their progress.

With only three days left until summer, the walls were towering and impenetrable, leaving only the gates to be built.

Horrified, the gods realized that not only would they lose the goddess of fertility forever, but that without the sun and moon the world would plunge into eternal darkness.

They wondered why they made such a foolish bet, and remembered Loki and his terrible advice.

Suddenly Loki felt like he wasn't so smart.

All his fellow gods threatened him with unimaginable pain if he did not find a way to stop the builders from paying.

Loki then hurried away, promising to resolve the situation.

It was dawn outside, and the carpenter was preparing to salvage the last load of stones.

But when he called out to Svadilfari, a mare appeared on the track.

She was so beautiful that Svadilfari shook off the reins, ignoring her master.

Masons tried to catch him, but the mare fled deep into the forest, also chasing Svadilfari.

The stranger was furious.

He knew there were gods behind this, and he faced them no longer as a gentle mason, but in his true form as a fearsome mountain giant.

This was a big mistake.

Thor has just returned to Asgard, but the gods have learned that giants are among them and have ignored their vows.

The only price the builder received, and the last thing he saw, was a swing of Mjolnir, Thor's mighty hammer.

When they set the last stone on the wall, the gods celebrated their victory.

But Loki wasn't among them.

It took several months before he finally returned, followed by a beautiful eight-legged gray foal.

The foal grew into a fine horse named Sleipnir, and became Odin's vehicle, a horse that could run beyond the wind.

But exactly where he came from was something Loki didn't want to talk about.

So I have had many successes in my life.

Over ten years ago, I started a business right out of college with my friend Scott.

Well, I had no business experience and no particularly grand plans. In fact, when we started, our goal was to never have to have a real job [laughs] and not have to wear a suit to work every day.

Check and check.

(Laughter) Today we have thousands of amazing employees and millions of people around the world using our software.

And, strictly speaking, even beyond Earth, including those currently on their way to Mars.

So you think you know what I do when I go to work every day.

Now, let me talk to you for a minute. I feel like I don't really know what I'm doing most days.

I've felt that way for 15 years, and have since learned that the feeling is called "impostor syndrome."

Have you ever gotten out of your own way by just guessing and bullshitting the situation, like you were a con artist out of your mind?

Well, I can think of many examples where I have felt this way.

It was my first interview with an HR manager, and I had never worked for a company with an HR department -- (Laughter).

Or when you walk into a board meeting in a t-shirt surrounded by suits, acronyms fly around, and you feel like a 5-year-old sneaking into a notebook and looking it up on Wikipedia when you get home.

(Laughter) Or in the beginning, when people would call and ask for accounts payable, I would freeze and think, "Wait, are they asking for money or are they giving it to us?"

(Laughter.) And then I covered the phone, covered the phone mouthpiece, and said, 'Scott, you're in charge of the accounts,' and handed it over.

(Laughter.) We were both working a lot at the time.

So, impostor syndrome for me is the feeling that I'm already firmly rooted in the situation, even though I'm pretty out of my depth and well.

Internally, I know I don't have enough skills, experience, or qualifications to justify being there, but I'm still there, and I can't get out of it, so I have to find a way.

It's not fear of failure, it's not fear of what you can't do.

It is rather the feeling of escaping something, the fear of being discovered that at any moment someone will figure this out.

And if they get it, you'll honestly think, "Well, actually, that's fair enough."

(Laughter) One of my favorite authors, Neil Gaiman, made this so beautifully in his college commencement address, "Make Good Art."

I want to make sure his quote is correct.

"I was sure that when there was a knock on the door, a man with a clipboard would come and say that it was all over, that we had caught up, and that now we had to do the real work."

I still get the feeling that when there's a knock on the door, the clipboard guy in black will be there to tell you it's time.

And I'm a bad cook, so just having someone bring pizza to my kids makes me feel very secure.

(Laughter) But it's important to note that it's not all bad.

I think there is a lot of good in that feeling.

And this isn't some kind of "get started now" motivational poster.

This is rather an introspection of my own experiences with impostor syndrome and how I was trying to learn how to harness it and turn it into a force for good.

A good example of these experiences can be found early in Atlassian's history.

We were about four years old and had about 70 employees.

And by auditor advice, where most good stories start with auditor advice (laughs), we entered the New South Wales Entrepreneur of the Year competition.

Well, I was surprised when I won the New South Wales Entrepreneur of the Year award in the young category for entrepreneurs under the age of 40.

There were 8 categories.

And in fact, I was so surprised when I saw the list of opponents that I didn't even go to the awards ceremony.

So Scott collected the gongs himself.

Then we headed off to the National Awards Ceremony.

I thought maybe I should rely on them.

So we rented a suit, invited a girl we'd just met - I'll be right there - (Laughter), and headed out to a big black tie party.

Well, our surprise turned into shock at the first prize of the night, the young category, beating every other state to win the Australian Young Entrepreneur of the Year Award.

When the shock wore off, we had a ton of champagne on the table, the party started and the night was definitely over.

We had a wonderful time, like royalty.

Fast forward to the final awards of the night and our shock turned to everyone's when we won the Australian Entrepreneur of the Year ahead of all other categories.

Well, in fact, everyone else was so shocked that the announcer, the CEO of Ernst & Young, opened the envelope and the first words out of his mouth were, "Oh my God."

(laughter) And then he reset his mind and announced that we had won.

(Laughter) So we knew we were too deep.

And from there, the problem got even deeper. Because we're off to Monte Carlo to represent Australia in the World Entrepreneur of the Year against 40 other countries.

Well, I was at the dinner table in another rental suit, sitting next to a lovely man named Vermiro de Azevedo, the winner from Portugal.

total champion.

The 65-year-old has been running the business for 40 years.

His workforce was 30,000.

Remember, we were 70 at the time.

And his turnover was 4 billion euros.

And after a few glasses of wine, I remember admitting to him that we didn't deserve to be there, that we were way over the limit, and that one day someone would understand this and send us back to Australia.

And he stopped and looked at me and said that I feel exactly the same way, I think all the winners feel the same way, that even though neither Scott nor I know anything about technology, what we're doing is clearly right and maybe we should keep going.

(Laughter) Now, this was a very big light bulb moment for me for two reasons.

One, I realized that other people felt the same way.

And two, I realized that success in any form doesn't make it go away.

I used to think successful people didn't feel like they were cheaters, but now I know it's more likely the opposite.

And this is not the only feeling I have at work.

It happens in my personal life too.

In the early days, I used an Atlassian company to fly to and from San Francisco every week, earning a lot of frequent flyer points and access to the Qantas business lounge.

Come on, if there's a place where I don't belong...

(Laughter) It doesn't help when I walk into the store, they usually see me in shorts and jeans or jeans and a t-shirt and say, "Son, can I help you? Are you lost?"

But in any case, sometimes the unexpected happens in Qantas lounges.

More than a decade ago, one morning as I was sitting there on my weekly commute, a woman who looked extraordinarily beautiful walked into the Qantas lounge, mistaken her identity and kept walking straight towards me.

She thought I was someone else, so in this case I was actually a cheater.

(Laughter.) But instead of freezing like I historically did or chivalrously letting her know of her mistake, I just tried to keep the conversation going.

(Laughter) And then the classic Australian shit became a kind of forward movement and a phone number.

And I took the girl to the awards ceremony a few months later.

And now, over ten years later, I am incredibly blessed to have her as my wife and four wonderful children.

(Applause.) But I wouldn't wake up every morning and roll over and look at her and say, 'She's going to say, 'Who are you, who gave you that side of the bed?' (Laughter) 'Get out of here.'" But she didn't.

And I think she feels the same way sometimes.

And apparently, that's one of the reasons why our marriage is likely to be successful.

While researching this talk, I found that one of the characteristics of the most successful relationships is when both partners feel outside their standards.

They feel their partner is out of their level.

They feel like scammers.

And if they stay unfrozen, appreciate, work harder, and strive to be the best possible partners, the relationship is very likely to be successful.

So if you have these feelings, don't freeze.

Try to keep the conversation going, even if she thinks you're someone else.

Now, it actually happens quite often that I feel like someone I'm not, or that people think I'm a different person.

A good example from my very recent past, a few months ago, I was staying up late with one of my kids when I saw on Twitter Tesla saying that one of its large industrial batteries could solve South Australia's spate of power crises.

I thoughtlessly posted a ton of tweets, questioning if they were really serious about this.

In doing so, I was able to kick a very small stone off a very large hill. It became an avalanche, and when I woke up, I was tumbling down in the middle.

Because, you know, a few hours later, Elon tweeted back to me saying they were very serious and could have a 100 MWh facility installed within 100 days of signing the contract. This is one of the largest world-class sized giant batteries ever made on the planet.

And then all hell really broke loose.

Within 24 hours, every major media outlet texted and e-mailed me asking for some kind of "expert" opinion in the energy field.

(Laughter) Well, at the time I couldn't explain exactly the difference between a 1.5 volt AA battery used in a child's toy and a 100 megawatt hour industrial scale battery facility in South Australia that could solve the power crisis.

I used to have chronic impostor syndrome right now (lol) and it got really weird.

And I remember thinking,

If I give up on this situation, it will be like pushing renewable energy back in Australia and probably just looking like a complete idiot for my stupidity on Twitter. ”

So I thought all I could do was try and learn not to freeze.

So I spent a week trying to learn everything I could about industrial-scale batteries, grids, renewable energy, the economics of all this, and whether or not this was a viable proposition.

I have spoken to the chief scientist, I have spoken to the CSIRO, and multiple ministers and prime ministers have tried to get their point across to me from both sides of the aisle.

I was able to exchange tweets with the Prime Minister.

For example, I could even make a decent impression about ABC Lateline's energy experts.

(Laughter) But as a result of all this, South Australia actually ran a battery tender, and that battery tender had over 90 submissions.

And the months-long public debate has shifted from a kind of theatrical hunk of coal in Congress to a debate about which industrial-scale battery chemistries are best suited for building large-scale renewable batteries.

So I think the key lesson is that by that time in my life I knew very well that I was a cheater.

I knew I was miles off limits.

But instead of freezing, I used the fear of being seen as a fool in general to motivate me to learn as much as I could and try to turn it into some kind of power.

So one thing I've learned is that people think that successful people don't feel like they're cheaters.

But I think the opposite is more likely, especially when you know a lot of entrepreneurs.

But the most successful people I know don't question themselves, but they regularly question their ideas and knowledge deeply.

They know the water is too deep and are not afraid to ask for advice.

They don't see it as a bad thing.

And they use that advice to refine, improve, and learn from their ideas.

And it's okay to step out of your depth at times.

I often get out of my depth.

It's okay to step out of your depth.

Even if you're in a situation where you can't hit the eject button, as long as you don't freeze, take advantage of the situation, don't paralyze it, and try to turn it into some kind of power, it's fine.

And it's important to say "harness" here. Because, to me, this is not the kind of pop psychology of overcoming impostor syndrome.

just be aware of it.

In fact, I am here to know very well that I feel as though I am an impostor. A pseudo-expert on emotions I couldn't even name a few months ago when I agreed to give this talk.

If you think about it, that's the point.

(laughs) Thank you.

(applause)

The first half of the 20th century was an absolute disaster, a cataclysm in the human situation.

There was World War I, the Great Depression, World War II, and the rise of communism.

And each of these forces split the world, tore the world apart, split the world.

They built political walls, trade walls, traffic walls, communication walls, and the Iron Curtain to divide people and nations.

Only in the second half of the 20th century did we slowly begin to emerge from this abyss.

Trade walls began to crumble.

Here is the data on tariffs: Fees start at 40 percent and go down to less than 5 percent.

We have globalized the world. And what does that mean?

This means that we have expanded our cooperation across borders. We have made the world more collaborative.

The walls of traffic crumbled down.

As you know, in 1950 a typical ship carried between 5,000 and 10,000 tons worth of goods.

Currently, container ships can carry 150,000 tons. It can be operated with a small crew. Unloading is now possible faster than ever before.

Needless to say, the communication barrier, the Internet, is crumbling.

And, of course, the Iron Curtain, the political wall, has come down.

All of this is great for the world now.

trade increased.

Here are just a few of the data.

In 1990, China's exports to the United States amounted to $15 billion.

Over $300 billion by 2007.

And perhaps most notably, at the beginning of the 21st century, for the first time in modern history, growth spanned nearly every region of the world.

So, I already mentioned that China has been growing 10 percent every year since about 1978, when Mao Zedong died.

Year after year, it's just incredible.

Never before in the history of mankind have so many people emerged from such abject poverty as in China.

China has run the world's largest anti-poverty program in the past 30 years.

India started a little later, but in 1990 it began to grow tremendously.

Earnings were less than $1,000 a year at the time.

And it nearly tripled over the next 18 years.

6% annual growth. It's really incredible.

Now, Africa, Sub-Saharan Africa -- Sub-Saharan Africa is the slowest growing region in the world.

And you can see the African tragedy in the first few bars here.

Growth was negative.

In fact, people were getting poorer than their parents, and sometimes even poorer than their grandparents.

However, there was growth in Africa in the late 20th and early 21st centuries.

As you can see, I think there are reasons for optimism. Because I believe the best is yet to come.

Well, why?

At today's cutting edge, new ideas drive growth.

This means products with very high R&D costs and low manufacturing costs.

More than ever, ideas of this sort are driving cutting-edge growth.

Well, ideas have this amazing property.

I think Thomas Jefferson did a really good job of expressing this.

He said, "Those who receive ideas from me will be guided by themselves without compromising my ideas.

May those who light my candle receive light without darkening me. ”

Or, put a little differently, an apple can feed one person, but an idea can feed the world.

This is nothing new. This is virtually nothing new for the TEDster.

This is essentially a TED model.

But what's new is that the larger capabilities of ideas will drive growth more than ever.

This is why trade and globalization are more important and powerful than ever, driving growth ever faster.

And to explain why that is the case, I have a question.

Suppose you have two diseases. One is rare and the other is common, but equally serious if not treated.

If you had to choose, would you prefer a common disease or a rare disease?

Common, Common -- I think you're totally right, but why? Because there are more drugs for common ailments than for rare ailments.

The reason is incentives.

A new drug costs about the same to manufacture whether it treats 1,000 people, 100,000 people, or 1 million people.

But if we can treat 1 million people with this drug, the revenue is even greater.

So the incentive to manufacture drugs that treat more people is much greater.

To put this another way, bigger markets save lives.

In this case, misfortune really loves a companion.

Now consider the following: If China and India were as wealthy as the US is today, the cancer drug market would be eight times larger than it is today.

We're not there yet, but it's happening.

As other countries get richer, the demand for these medicines will increase significantly.

And that means greater incentives for research and development to benefit everyone around the world.

A bigger market creates more incentive to generate all sorts of ideas, whether it's software, computer chips, or new designs.

For Hollywood insiders in the audience, this even explains why action movies have larger budgets than comedies. Action movies have a bigger market because they are easier to translate into other languages ​​and cultures.

People are willing to invest more and have bigger budgets.

are you OK. So if the market grows and the incentives to come up with new ideas increase, how do you maximize those incentives?

By uniting the world market and globalizing the world.

What I mean by this is "one idea". Ideas are meant to be shared, so one idea can serve one world and one market.

One idea, one world, one market.

So how else can you generate new ideas?

That's one reason.

Globalize your trade.

How else can you generate new ideas?

Well, the number of idea creators has increased.

Now creators of ideas, they come from all walks of life.

Artists and innovators -- many of the people you've seen on this stage.

I focus on scientists and engineers. Because I have data about it and I'm the data owner.

Well, today, scientists and engineers make up less than a tenth of 1% of the world's population.

(Laughter.) The United States was the idea leader.

Most of those people are in the United States.

But the United States is losing its ideological leadership.

And I am very grateful for that.

That's good.

For too long, the United States and a handful of other developed nations have shouldered the full burden of research and development, so fortunately we are becoming less idea leaders.

But consider the following. If the world as a whole were as wealthy as the United States is today, there would be five times more scientists and engineers contributing to ideas shared by all, benefiting all.

I am reminded of the great Indian mathematician Ramanujan.

How many Ramanujans are there in India right now, struggling in the fields, unable to feed themselves when they could feed the world?

We are not there yet.

But it will happen within this century.

This is the real tragedy of the last century. If you think of the world's population as giant computers, massively parallel processors, the biggest tragedy is billions of processors going offline.

However, in the 20th century, China is in full swing.

India is in full swing.

Africa is in full swing.

We will see Einstein in Africa in this century.

Here are just some of the data. This is China.

1996: Less than 1 million new university students in China annually. 2006: Over 5 million.

Consider what this means.

This means we all benefit when other countries get richer.

We should not fear other countries getting richer.

A prosperous China, a prosperous India, a prosperous Africa, that is what we should embrace.

We need a bigger demand for ideas, a bigger market that we talked about earlier, and a bigger supply of ideas to the world.

Now you know some of the reasons why I'm optimistic.

Globalization has increased the demand for ideas and increased the motivation to generate new ideas.

Investments in education are increasing the supply of new ideas.

In fact, a look at world history offers several reasons for optimism.

From the beginning of mankind to 1500: Zero economic growth, nothing.

1500 to 1800: There may be some economic growth, but not as much growth in 100 years as we would expect in a year today.

1900s: Probably 1 percent.

20th century: 2% stronger.

The 21st century could easily be 3.3 and even higher.

Even at this pace, by 2100 the average global GDP per capita will be $200,000.

This is the global GDP per capita, or $200,000, not the US GDP per capita, which would be over 1 million.

It's not that far.

I can't make it.

But some of our grandchildren probably will.

And let me tell you, I think this is a pretty conservative prediction.

In Kurzweil's terms, this is dark.

In Kurzweil's terms, I'm like the Eeyore of economic growth.

(Laughter) Well, what's the problem?

What about the Great Depression?

Well, let's see. Let's take a look at the Great Depression.

This is GDP per capita from 1900 to 1929.

Now imagine, in 1929, that you were an economist trying to predict the future growth of the United States, not knowing that the economy was about to fall off a cliff and certainly be entering the greatest economic disaster of the 20th century.

What would you have expected if you didn't know this?

If you were based on predictions from 1900 to 1929, you would have predicted:

If you were a little more optimistic, given, say, the Roaring Twenties, you would say:

So what actually happened?

I fell off a cliff, but I got back on my feet.

In fact, growth in the second half of the 20th century was even higher than predicted based on the first half of the 20th century.

Growth can therefore wash out even what looks like the Great Recession.

are you OK. what else?

oil. oil. This was a big topic.

Oil was $140 a barrel when I was writing the note.

People asked questions there. They were saying, "Is China drinking our milkshakes?"

(Laughter) And there is some truth to this. It means that the resources we have are limited, and that growth will push up demand for them.

But I don't think we need to tell this audience that rising oil prices are not necessarily a bad thing.

Moreover, as we all know, it's energy, not oil, that matters.

And higher oil prices mean more willingness to invest in energy research and development.

You can see this by looking at the data.

When oil prices rise, so do energy patents.

Today the world is much better prepared to overcome rising oil prices than it was in the past because of what I am talking about.

One idea, one world, one market.

Therefore, as long as we adhere to the two ideas of continuing to globalize the world market, continue to expand cross-border cooperation, and continue to invest in education, I am optimistic.

The United States now has a particularly important role to play in this regard. To maintain the globalization of the education system and to keep it open to students from all over the world. Because the U.S. education system is like a candle that other students come to light theirs.

Now remember what Jefferson said here.

Mr. Jefferson said, "When they come and light our candles, they get light and we don't get dark."

But Jefferson wasn't quite right, was he?

Because, in fact, when they light our candles, we double the amount of light available to all.

So my take is 'be optimistic'.

Spread your ideas. spread the light.

thank you.

(applause)

This machine we all have in our skulls reminds us of Woody Allen's maxim about what's best to have in our skulls.

And this machine.

And it is built for change. It's all about change.

It gives us the ability to do tomorrow what we can't do today and what we couldn't do yesterday.

And of course it is a born fool.