In 1983, Dr. Terry Irwin called this canopy "the last frontier of life."

I'm going to take you into the world of these towering canopies, and I'll show you what the canopy researchers are asking and how they're asking the world.

Let's take a look at the forest from the ground up, our research hub, Costa Rica.

It's very dark underfoot, as you can see, because it's full of leaves and branches, and it's very quiet.

Now, I'm going to take you high up into the canopy. Instead of actually hoisting you up with ropes, I'm going to show you a short video from National Geographic's "Heroes on the Edge of Heaven."

It was shot in Monteverde, Costa Rica, so you know what it's like to climb a strangler fig.

(music) (grunt) (rust) Above the trees is a grassy world, where countless plants and animals have evolved to suit the canopy.

For example, this sloth evolved to use sharp claws to hang from trees.

Let's talk a little bit more about diversity, about ants.

10,000 species of ants named by taxonomists

4,000 of these ant species live only in the canopy

The reason I'm talking about ants is because my husband is an ant taxonomist, and when we got married, he promised to name an ant after me.

And two children, Augus Andrew and Erica, were also named after ants.

Ants may be the only family named after them

Besides my family, my passion is plants, especially epiphytes, which grow on trees.

Does not take root in epiphytic tree trunks or soil

Epiphytes get their nutrients from the leaves, which are contained in fog and haze.

There are more than 28,000 species of these epiphytes in the world.

They live in rainforests like this one, and they're also found in warm temperate rainforests in Washington State.

Moss is often seen among such epiphytes

The important point is that after these epiphytes die and decompose, they create arboreal soils in both temperate and tropical regions.

It is produced mainly by the decomposition of moss, and these mosses are like the sphagnum moss in your garden.

Ability to store large amounts of water and nutrients

Amazingly, when you turn up this epiphyte, you'll find a lot of net-like roots called canopy roots.

These aren't the roots of the epiphytes, they're the roots that grow from the trunk and branches of the parent tree that they're growing on.

So the epiphytes can contribute to the habitation of the trees and live in the tall trees instead.

My colleagues and I were fascinated by the changes in the evolution and development of the canopy and the surrounding forest plants.

We did a study to see how quickly the epiphytes repopulate once they've been stripped.

We initially expected the playback speed to be very fast and creep back from the edges.

But it turns out that it takes a very long time. It takes more than 20 years to get back to normal.

More than 25 years later, it still doesn't regenerate to the same height and condition.

I use this image a lot, and this is what the mosses look like.

Once it's gone, until then If you're very lucky, it may grow from the bottom

(Laughter) As you can see, re-emergence takes a very long time.

These canopies are collections of fragile things.

When we look up at the canopy in those pristine forests, we see huge layers of carbon spreading out.

One of the challenges that canopy researchers are facing right now is figuring out how much carbon the forest is taking in.

We know it's a lot, but we don't know the exact amount, and we don't know how carbon is taken from the air, stored in the plants that live there, and cycled through ecosystems.

Did you understand that the things that live in the forest canopy are not just grass and leaves that are useful only for Tarzan's life, but that they support the diversity of the ecosystem, contribute to the circulation of nutrients in the ecosystem, and stabilize the global environment?

In the canopy, for example, if you sit next to me and look outside of these forest ecosystems, you'll also see something like this.

Destruction of forests, harvesting of forests, fragmentation of forests, and human intervention deprive the epiphytes that grow in this canopy of their wonderful work.

I also looked at the city and thought about people who live outside of trees.

People who grow up in places like this don't have the opportunity to climb trees or interact with trees and forests the way I did when I was a kid.

a big obstacle for me

Today, being a forest ecologist is no easy task, and how do you go about finding answers to these and other questions?

It's even harder for someone like me, a little mixed-race woman in a small college in the northeast, far from wealth and power.

I keep asking

i think i can do something

As a scholar I have information As a human I can communicate with anyone With researchers and others

So let me introduce you to the initiative that I started, the International Canopy Network.

We tried asking questions about the canopy through the media. We have a canopy newspaper and a mailing list.

Through them, we promote the importance of the canopy, the beauty of the canopy, and the need for an intact canopy to non-researchers.

But many of the products we make, like this video, haven't reached everyone.

For example, I made a Barbie doll on a tree.

Me and my lab students buy Barbies from thrift stores, dress them in tailor-made clothes, and ship them along with a canopy handbook.

I think... (Applause) Thank you.

(Applause) We're doing a little bit of this coveted doll, and we're sending a message about how wonderful it is to have a woman scholar who studies trees.

We have partnered with artists who understand and communicate the beauty of trees and canopies.

Let's take a look at one of them: the collection of canopies.

My role is to meet a biologist and an artist, and we'll spend a week in the woods looking at nature, the trees, the canopy, talking, exchanging ideas, expressing each other.

the results were amazing

Let me show you some examples

This stunning installation is the work of Bruce Chao, Dean of the Sculpture and Blown Glass Department at the Rhode Island School of Design.

He found a bird's nest in one of the canopy clusters in the Pacific Northwest and created this beautiful sculpture.

Dancers once climbed above the canopy

Jodie Lomasque and her group "Condensers" have joined my rainforest research group in Costa Rica.

Created a wonderful dance called "Biome"

They danced in the woods, and through this dance I spread my research and connect with other environmental groups.By performing in many cities, I believe that biology, dance and environmental advocacy can make a difference.

The musicians have composed great music

A wooden flutist, an oboist, an opera singer, a guitar player and even a rapper.

Now listen to a snippet of Duke Brady's "Canopy Wrap."

It's Duke!

(Applause) Working with Duke inspired me to start a program called Sound Science.

I found Duke's song to attract the young people of the city.As you can see, a middle-aged professor like me doesn't have the charm to convey the importance of nature to young people and attract young people.

So I put together a rap singer named Caution and a young man in urban Tacoma.

We go to the woods and pick up a branch and caution raps it and suddenly the branch is cool

Afterwards, the students were invited to the studio to create their own raps to their own beats.

And in the end, I made a CD and took it home, and then I listened to it with my family and friends, expressing their experiences in nature in a medium that resonated with them.

The last project is one that I'm very attached to, and it's about economic and social value, and it's about epiphytes.

In the Pacific Northwest, there's a market that harvests moss from ancient forests.

These mosses are stripped from the forest and bought by florists and others at the flower market to be used for things like arranging vases.

This $265 million market is growing rapidly.

If you think back to the bald head I showed you earlier, you can see what was ripped off the tree trunks, and it takes decades to re-grow in the old forests of the Pacific Northwest.

So this is an unsustainable market.

What can I do as an ecologist?

The result of my thinking was to study how to grow moss without having to harvest it from nature.

How nice it would be to have a partner to help grow moss

And I thought it might be best for people who are in confinement because they don't have the opportunity to come into contact with nature, they have the time, they have the space, and they can work without sharp tools.

This made them the perfect partner

It was more than I imagined

they are very ambitious

(Applause) They're very passionate about their work.

I've also learned to identify different types of moss, and I'll tell you the truth, better than my students at Evergreen University.

And they agreed with the idea that growing moss could contribute to research.

Since then, we've discovered which varieties grow faster, and we've had more than expected success as partners.

Prison warden was also enthusiastic about the project, so I started giving seminars in prisons about science and sustainability.

In addition to myself, I welcome colleagues and people who are practicing sustainable activities.

I gave a speech once a month, and this has led to an amazing development of sustainability projects at the prison: organic gardens, worm compost, recycling, beekeeping for water reuse.

Also, in a new project, inmates and us are studying the rearing of the Oregon spotted frog, an endangered amphibian in Washington and Oregon.

The prisoner raises this frog in captivity, of course, from egg to tadpole to frog.

Many inmates experience the joy of raising frogs, hatching from eggs and returning them to nature, contributing to the proliferation of endangered species.

For many reasons, ecologically, socially, economically, and perhaps even the human soul, this project has had a wonderful impact, and I have a lot of hope for the future by teaching this research method not only to me and my students, but also to other scholars.

As we all know, the academic world tends to be introverted.

I encourage researchers to become more extroverted, to find their partners in the non-academic community.

And I'm hoping my husband, Jack, an ant taxonomist, will make Barbie's company Mitel and taxonomist Ken.

Or Ben Zander and Bill Gates working together on an opera about AIDS.

If Al Gore and the Naturally 7 made a song about climate change and made it happen, everyone would applaud.

It sounds like a fictional story, but I think it could be real.

Now that environmental problems are becoming more and more serious, it's time for academics to be diplomatic, and at the same time, it's time for people who aren't involved in science to turn their attention to academia.

I took up this job to use the tools of science to explore the mysteries of the forest.

And as I said, having partnerships has broadened my horizons, broadened my horizons, and given me a deeper understanding of nature and myself.

If you look in your heart, you can see the tree in it. This is an image of the real heart. The tree is in our heart.

When we understand nature, we are touching the deepest part of ourselves.

Through partnerships, I've also learned that humans tend to categorize each other -- tech people, film stars, academics -- but when we enjoy nature, when we share nature, we can find common ground.

Finally, as a scholar, and as a person, and as a new member of the TED community, I think I have better tools to interact with trees and forests and nature, to discover new nature, and to discover the human place in nature, no matter where you are or who you are.

thank you

(applause)

The "Dirty Jobs" crew and I were called to the small town of Craig, Colorado.

Craig is a small town surrounded by the Rocky Mountains.

the work was from the sheep ranch

For those unfamiliar with "Dirty Jobs," on the show I

Become an intern at Dirty Jobs Do the job

What I do is just try the work and get an honest experience of what kind of work they do.

This time, my job partner was a livestock sheep.

we go to craig and check into the hotel

The next day, when I learned that the job was to castrate sheep, I thought, "This is going to be a tough job."

So I don't usually collect information in advance

This time it was a sensitive subject, and as people who work for the Discovery Channel, we wanted to accurately portray our work.

And I wanted to do this work out of respect for animals.

I called an animal rights group and said, "I'm going to castrate a sheep. Can you tell me how you do it?"

They said, "Oh, it's very easy."

The tool is a band that is a little smaller than this kind of rubber-

This is from a deck of cards I played with yesterday - it looks just like this

"Then what steps do you take?"

"Tighten the band around the sheep's tail

Tighten another band around the scrotum

Then the blood circulation will slow down and you should be able to get it off in a week."

"Understood. Thank you."

And I called the SPCA, an anti-animal cruelty organization, and they're doing it right.

I called animal rights groups, and they reluctantly agreed.

"Yes, is this the right way to do it?"

The next day I went to the ranch

Riding horses, chasing sheep and locking them in fences we made, the animal husbandry experience began.

Melanie is Albert's wife

albert is a shepherd

Melanie grabs the sheep with both hands - one hand grabs the right leg and the left leg as well The sheep is placed on a platform and Melanie spreads her legs

yeah good

Albert approaches the table and I follow him.

I always look at the work process before taking on challenges

Correct appearance of an intern

Albert reached into his pocket and pulled out this black band, but instead it was a knife.

"It's not a band, it's a knife..."

He's got his knife blade out and the sun is shining over the Rocky Mountains, and it's a very -- unforgettable sight.

After a gap of two seconds, Albert put the knife between the cartilages of the buttocks, just below the buttocks, and in no time the tail was in the bucket I was holding.

Albert quickly grasped the sheep's scrotum firmly between his thumb and forefinger.

I pulled it forward and took out the knife again and cut the tip.

What happened next... don't know? OK

Albert cut it off with a pair of scissors, threw the tip over his shoulder, lifted his scrotum, though I couldn't see what was going on in his head.

I heard a slurping sound. It sounded like someone was tearing a piece of nylon cloth - I'm not kidding Can you play the video?

I'm kidding, I can't show you the video

(Laughter) Maybe I should have had a picture.

But then you asked for a timeout

Those of you watching probably know, but shooting is a one-shot game, there's no second shot.

No script, no pretense, no nonsense

I don't do stupid things, I don't rehearse, it's just what I filmed

But I said, "Stop it, this is crazy"

Insane... (laughs) "It's definitely funny.

I can't do this."

Albert has a "what?" face

"I don't know what happened, but taking the testicles like this is wrong."

"This is how we do it," says Albert

I asked, "Why are you doing this?"

Without waiting for him to explain, I said, "I want to castrate him the right way with a band."

He said, "Like animal rights groups do?"

"Yeah, like animal rights groups do.

So that the sheep don't cry like this and bleed—

'Dirty Jobs' will air worldwide

Twice a day on the Discovery Channel! '' he agreed

he took the band out of the box

Melanie laid down another sheep and put bands on the tail and on the scrotum

Then the sheep staggered, took two steps and fell, trembling a little, got up and took a few more steps and fell.

I thought this was not good for sheep

I get up and walk to the corner, shivering

lying down in a lot of pain

I saw this sheep and I said, 'Albert, how much?

how long will it take to get up again when asked

I answered "1 day"

"A day!? How long does it take for the testicles to fall off?"

"1 week"

Meanwhile, the knife castrated sheep was walking around and the bleeding had stopped.

Biting grass, jumping and jumping, great energy

That's when I realized my mistake.I realized I was completely wrong.

(Laughter) I felt like I had taken the shortfall, because I had to castrate almost 100 sheep the way Albert did.

All of a sudden, I feel like I'm in some weird pornography. Whoa... (Laughter) Melanie grabs a sheep, puts it on a table, and spreads its legs.

Albert gave me the knife

take it and cut off its tail

grab the scrotum and cut off the tip

"Press" as Albert instructs

Press "Press more"

push more

Then, a testicle that looked like a thumb appeared in front of me.

he says "chew"

"Bite and tear"

I could hear the instructions properly, but! (Laughter) How did this happen?

Why really why is this happening! ?

(Laughter) My brain almost stopped functioning. I was standing there, surrounded by the Rocky Mountains, and I was thinking about Aristotle's definition of "tragedy."

Aristotle said, "Tragedy is when you face your true humanity."

(Laughter) "What is this awful metaphor?

I don't like the idea of ​​thinking like this! But I can't get this out of my head

I can't take my eyes off what's in front of me, so I decided to do it.

and done

I pulled out my face like this

I stood with two testicles on my chin

(Laughter) Still stuck with that Aristotelian analogy.

Still trapped in his book And suddenly two words crossed my mind Words I haven't heard since I stuffed them in college

It is anagnorisis and peripeteia

anagnorisis and peripeteia anagnorisis are Greek for "discovery"

Literally the transition from ignorance to knowledge is "discovery"

That's what our show "Dirty Jobs" does

I'm telling you this "discovery" every day

great another word peripeteia

For example, in Euripides and Sophocles' tragedy "Oedipus the King"

The tragedy that the woman Oedipus took as his wife and even impregnated was his real mother. This is the peripeteia.

In other words, it's "donden-gaeshi"

This metaphor stuck in my head, and I had "discovery" and "turnaround" on my chin.

If you look for "turnaround", you'll find it lying around everywhere In "The Sixth Sense", Bruce Willis

I've been helping a child who can see dead people all this time, but in fact he himself is dead - this is the twist.

Right?

do things the audience doesn't expect

Neo in "The Matrix"

actually lived in a computer world

These "discoveries" lead to "awareness"

I've done over 200 Dirty Jobs, and every time there was a realization, but this one I wasn't prepared for.

I stood there looking at the sheep that I had castrated and they looked very happy and healthy, and I looked at the other poor sheep that I had castrated the "right" way, and I thought, "If I'm wrong about this one, I'm sure I'm doing a lot more wrong. I might be misunderstanding a lot of things."

Not me, but I have a friend who is a social anthropologist.

I consulted him

(Laughter) He said, "Hey Mike

I don't know if this would interest you, but have you noticed it's being filmed in every state?

I work in mines, I go fishing, I work in steel mills, I work in most industries.

Politicians who work side by side with people in every industry desperately trying to get along with them every election? said

Even Hillary works in the rye and sweats in the steel mills And I work with them every day.

"If you have something to say to a politician, don't miss the opportunity.

Because you only get one chance every four years."

With my testicles on my chin I've been thinking about that

After filming, "Dirty Jobs" was the same show-wise, but I changed a lot.

When I talk about the show, I no longer talk about things that the majority of people like.

Sometimes I do, but I've come to talk about the mistakes I've made.

People who play Dirty Jobs are happier than viewers imagine

They are the happiest people I know

I don't want to talk about labor unions here.

I'd like to say they strike a nice balance and do Dirty Jobs Some people are whistling Collecting carcasses of road animals -

I did this job

they have a good balance between work and life

i've seen it over and over again

So I thought, what if we try this Dirty Jobs?

I've been talking here for hours, "Follow your dreams!"

What do you mean by "go for a dream"?

Probably the least helpful piece of advice I've been given (laughs).

Chase your dreams and hit them and break them?

I grew up hearing this

But I didn't know what I wanted to do Then he said, "Follow your dreams, you'll find out"

let me give you some examples

Bob Comb is a pig farmer in Las Vegas who collects food scraps from casinos to feed his pigs.

Food scraps are rich in protein

His pigs grow twice as fast as normal He's a big pig farmer And he's good for the environment

He makes a living out of this His smell is strong But now he's successful and has a good life

When I asked him, "Have you been chasing your dreams?"

he will laugh

He was offered a $60 million investment, but he turned it down and lives outside of Las Vegas.

he didn't chase his dreams

He took a step back, looked in the direction they were going, and went the other way.

Matt Freund is a Connecticut farmer who one day realized that cow manure could be a more valuable, greener fertilizer than milk.

He's selling it to Walmart now 'Go for it' - really?

So I started thinking about "dreams" I started thinking about "effectiveness" and "efficiency"

As I said before, these two are completely different.

"Teamwork" "Decision"

These cliches hang in boardrooms all over the world as "secrets of success."

Is safety the most important thing? Back to Occupational Safety and Health Act (OSHA) and Animal Welfare Organizations

What if OSHA got it wrong?

So, if - as crazy as it may seem - if it's actually "safety third"

what about? (smile)

but it really is

What I'm trying to say is, when I do Dirty Jobs, I value safety, but those who actually work don't think safety comes first.

Other things come first - getting the job done comes first

I'll never forget this time I was on a crab fishing boat in the Bering Sea in the first year of the show.

A place 100 miles from Russia where a 15-meter wave hits the cockpit

It was the most dangerous environment I've ever been in. I was 12 meters from the deck.

I was putting down a crab cage, but it felt like I was on the edge of a cliff Beyond the cliff was a raging sea, not to mention it was very dangerous.

I crawled into the cockpit and in disbelief I said, "Captain OSHA!" He said, "OSHA? Ocean?"

and pointed to the sea

(Laughter) He then said something unbelievable.

Things you shouldn't say in any factory or state

He looked at me and said, "Son" - he and I were the same age, but he called me son - "Son, I'm the captain of a crab fishing boat.

It's not my responsibility to get you home safely

It's my responsibility to make you rich and bring you home."

(laughs) "It's your responsibility to return alive."

Then I put my own safety first

I did my best to ensure that this kind of misunderstanding, the mistake of confusing one's own responsibilities with the responsibilities of others, is a common occurrence.

just like this

I could tell you all about the mistakes we've made, but what I want to say is this.

I want to tell you my theory in the remaining 2 minutes and 30 seconds.

So the thing is, our society has begun to think of work as the "enemy."

This is like a civil war, you could call it a cold war

It wasn't like that from the beginning, it wasn't like that on purpose, but it happened

And war broke out in four places, one in Hollywood.

The way people worked was laughed at on TV.

Plumbers are always portrayed as giants weighing over 100kg

watching tv

That's a typical plumber, right?

And make them heroes, make them laugh—

this is what tv does

In "Dirty Jobs" I'm trying so hard to avoid it So I try Dirty Jobs I'm not cheating But Madison Avenue is also a battleground

A lot of commercials are made here, but do they tell the truth?

"Work less to improve your life. You don't have to work hard. Go home early. Retire early. That's okay."

The next battlefield is Washington, D.C. The policies and trades here

It affects every job, but I don't know, all I know is that it's the front line of the war.

And here in Silicon Valley

How many people have iPhones?

who has a blackberry?

we are always connected

I don't mean to say that technological progress has created bad things.

There are many people involved here...

(Laughter) I just want to say, "Innovation without imitation is a waste of time."

No one imitates the way people do dirty jobs

Making the same interface, the same circuit, and the same board over and over is as necessary for invention as the existence of a single genius.

Thanks to that, we can use the iPhone now.

Our tools are different than they used to be

It has become portable

It's the result of many small jobs piling up.

So I don't know how much work I'll be able to experience in the future, but I want to try as many jobs as possible.

All I have to face is that I've been wrong about many things, not just this one.

i've made a lot of mistakes

So we -- and I, myself -- should be thinking more seriously about how to get people to work.

doing the necessary work

It may be the sermons that old people say that they've heard many times, but little by little, important things are being lost.

President Obama said he wanted to create 2.5 million jobs in the huge infrastructure industry.

fierce competition like war

On the other hand, the number of vocational school students is greatly decreasing.

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

But the jobs that we're trying to create with infrastructure are these jobs -- these jobs that are on the decline.

According to the American Society of Civil Engineers, we need at least $2 trillion to invest in infrastructure to get the infrastructure industry back on its feet. But let me tell you one thing.

The jobs we're trying to create with infrastructure won't last long - people don't want to be in those jobs.

The purpose of TED is to celebrate what's important to us, but I also don't think clean and dirty are antonyms.

They are two sides of the same coin Like innovation and imitation Like risk and responsibility Like periperia and anagnorsis The suffering sheep taught me this It's about time

It was an honor to speak with you.

Shall we go back to work?

(applause)

Who am I?

Answering the question "What is your occupation?"

Because "I'm a hardware store" is a convenient word for all my work.

So I introduced myself to an unsuspecting investor at an event in Silicon Valley, and he said, "You're so old-fashioned."

(Laughter) I couldn't say anything back.

I should have said something nice

Looking back, in retrospect, I might have said, "Well, let's look 100 years from now, and look at all the different issues of the last few days, and a lot of the issues, like water quality, clean energy, they're compatible in a way, and the replacement for cleaner, more functional materials seems like it's all a matter of hardware.

I'm not saying that you don't need software or information or computing.

Actually, that's what I want to talk to you about today.

So in this talk, I'm going to talk about how things are made, and the new ways things are made in the future.

Now, TED is sending a lot of SPAMs to its speakers, and they're asking you to fill out a lot of forms, saying, "This is it, this is it."

I've always been nervous about the word "futurist," because you can't predict the future, and you're bound to fail.

When I was joking around with a very good colleague like that, and I said, "If you could talk about the future, what would it be?"

George Homsey - good guy, said, "The future is great.

it's really weirder than you think

You can reprogram your gut bacteria to make your poop smell like peppermint."

(Laughter) Now, you might think that this story is completely ridiculous, but there's actually something really amazing happening that makes that kind of thing a reality.

This is not my work, but my good friend's work at MIT.

It's called the Register of Standard Parts of Biology.

It's led by some very smart people, including Drew Endy and Tom Knight.

So they think of living things as programmable systems.

Literally think of proteins as subroutines, and think that you can run a program by chaining subroutines together.

This concept is developing into something very interesting these days.

This is a state diagram, a very simple computer, so to speak.

This is a 2 bit counter

It's basically the computer version of two light switches.

A group of students from Zurich submitted it to a biology design competition.

And last year, after the same competition, a group of students at the University of Texas programmed a bacterium to detect light and switch it on and off.

It's really interesting because you showed that you can do "if-then-for" constructs with matter and structure.

It's an interesting trend, because we've lived in a world where form follows function.

I've been thinking about that for six years, and I've drawn a cartoon that I call "How Toon," to show the power of art over science.

I drew this with an amazing illustrator named Nick Dragotta.

I spent six years at MIT on my own, and it took me quite a few pages to explain what I was doing, but in his hands, it was just one page. This is our muse, Mr. Tucker.

He's a funny kid, and his sister Celine, what he's doing right now is watching the cereals in the bowl self-assemble.

So you can program the material to self-associate, so you can dip the ends in chocolate and change the hydrophobicity or hydrophilicity.

In theory, if you program it correctly, you can do some pretty interesting things, and you can create very complex structures.

In this case, we self-replicated a complex three-dimensional structure.

This is the result of a long thought, because now that's how we make things.

It's a silicon wafer, and it's just two-dimensional structures layered on top of each other.

Speaking of features, people would say, around 65 nanometers [current limit].

The ones on the right are radiolarians.

Radiolarians are single-celled organisms found everywhere in seawater.

They're as small as 20 nanometers, and they feature complex three-dimensional structures.

If we could figure out how to make something like this, we could do a lot more with computers.

The secret of biology is that the way organisms are built includes computational methods. This polymerase is an enzyme designed to replicate DNA. It's like a supercomputer.

And ribosomes, too, are little computers that help translate proteins.

I thought about this because it's interesting to build something out of biological materials, but can we do something similar?

Is it possible to create a self-replicating "behavior"?

In other words, can inorganic systems autonomously create complex three-dimensional structures?

Because inorganic systems, like high-speed semiconductors, have some advantages.

I'm going to show you some of the research that I've done, and it's about how to build self-replicating systems.

It's basically a replica of Babbage's invention, a little mechanical calculator.

And this is a state machine with five states.

There are about 3 light switches here

If you don't do anything, it won't connect

Duplication is possible by concatenating them into a bit string

Start with white, blue, blue, white

If you code it like this, it will replicate, one becomes two, then three.

You can create a system that makes copies like this

This is the work of Lionel Penrose, the father of Roger Penrose, known for the "Penrose Tiles".

This theory, which was primarily developed in the '60s and never had a chance to be put into practice in the shadow of the digital computer revolution, has recently been revisited.

I'm going to show you what fully autonomous self-replication looks like.

When you checked the sequence in the previous video, it was green green yellow yellow green.

Start on the air hockey table like this

In the high-tech world, we use an air hockey table. (Laughter) It's dizzying to watch, but what you see is a copy of the original array emerging from this box of parts.

This is bit string self-replication

Now, what exactly do you want to make a copy of the bit string for?

There's another interesting meme in biology, which is linear arrays that are convenient to replicate and fold into arbitrarily complex three-dimensional structures.

I was trying to create an engineer's version of the meme. Can you build a mechanical system out of inorganic matter that does the same thing?

What I'm showing you now is how to make a two-dimensional shape, where you can create a shape from a linear array of components that follow a very simple set of rules.

The reason we use very simple laws, and the amazingly simple state machine that you just saw in the design, is that you don't have to use digital theory to calculate it.

Because this way it can be shrunk to an even smaller size than a microchip.

Can be used as micro parts when assembling

I think Neil Gershenfeld showed you this video on Wednesday, but I'd like to show you it again.

This is literally an array of colored tiles.

Each color has a different magnetic polarity, and the sequence specifies a unique structure.

If you're familiar with graph theory, I think you'll be convinced at a glance that you can create arbitrary 3D structures. For example, after chopping up a dog, you can reconstruct it from linear arrays that fold based on their connection order. And then you can define 3D objects as arrays of bits.

It's pretty interesting to look at the world from a slightly different point of view like this, isn't it?

When the universe is likened to a compiler

I wonder, what is the program necessary to program the physical universe?

Or you can think of materials and structures as a kind of information and computational problem.

It's not just a microcontroller on the edge, it's the structure, the machine itself, that's the computer.

I've mastered this way of looking at things, and it's allowed me to look at a lot of issues a little differently.

If the universe were a computer, we could interpret this drop of water as a calculated result.

You set the boundary conditions, such as gravity, surface tension, density, etc., and when you hit the "run" button, it magically creates a perfect spherical lens out of space.

This can be applied to problems such as, for example, there are said to be between 500 million and 1 billion people in the world today who can't afford cheap eyeglasses.

It will be possible to create a machine that can produce prescription lenses on the spot.

This is literally a machine that defines the boundary conditions.

If it's circular, you can make a spherical lens.

If it's elliptical, we can make a lens for astigmatism.

And then, after that, apply the membrane, apply pressure, and this process is part of the additional program.

With just those two inputs, just the shape of the boundary conditions and the pressure, we can define an infinite number of lens shapes that can correct for any refractive error in the human eye, ranging from -12 diopters to +8 diopters, up to 4 diopters for cylindrical lenses.

and injection of monomer

I'll do it like Julia Child

UV light for 3 minutes

You reverse the pressure on the membrane and remove it when the reaction is over.

I'm watching this video too, but I still don't know if it works

(Laughter) Now I'm going to reverse it. I made a movie a long time ago, but in the new prototype, both sides of the lens are flexible, but you can still see the point.

When the lens is complete, pull it out.

This is the shape of the Yves Klein branded glasses coming out next year.

You can see that it contains a light power of about -2 diopters.

If you rotate this side shot, you can see that it's a cylindrical lens, and that's literally built into the physics of the system.

So when you think of structure like this as computation, and when you look at structure as information, you can use it for other things.

This is what my staff in the SQUID lab is currently developing called an "electronic rope."

The rope weave has a very complex structure,

Shows one structure when no load is applied

Different loads result in different structures, and you can take advantage of that by weaving in a very small number of conductive fibers to make them literally sensory.

Now you have a rope that can detect where and how much load is being applied.

If you think of the physical properties and materials of things that exist in the world as a computer, this kind of thing becomes possible.

Now let's move on to the next topic

I would like to briefly touch on what I think about this.

What I'm most interested in right now is how we generally make things when we think of the universe as a computer, and whether we can make things in the same way as we do when we share open source hardware.

So many TED Talks over the years have championed the benefits of getting more people to think about the same problem, sharing information and working together.

The nice thing about being human is moving along linear time, and unless Lisa Randall changes that, it will always be.

I mean, whatever you do, whatever you build, you follow the sequence of steps, and the most elegant way to do that in the '70s was LEGO.

Not only that, but they showed me how to build things step by step.

So I'm trying to figure out how I can generalize the way things are made, and end up looking like this character, right?

This idea can be applied to many different ways of thinking.

Yesterday, Cameron Sinclair said, "How can we achieve cooperation in designing homes that benefit all of humanity?"

And Amy Smith gave a talk about how we can get MIT students to work with people in the Haitian community.

I think we need to redefine and rethink how things are constructed, what they are made of, how they are assembled, so that on a deeper level we can share the source code of what we have.

I don't know what to do right now, but there's actually a lot of active discussion going on about this topic.

The discussion leads to questions such as Is this a compiler, for example? Is it a subroutine?

that's an interesting question

Maybe my talk is too abstract, but I think this return to cartoon characters and the universe, or more precisely, different ways of thinking about the universe, is going to be very common in the future, from biotech to material assembly.

We're starting to invest in materials science, but it's a new way of thinking in materials science.

So, how can we use real information and structures in new ways of thinking to see the world in a different way? So analog computers, not binary code, will define the computers of the universe.

But it would definitely be a novel worldview.

I talked too much, it seems like it's almost over

We could have a question-and-answer session for the rest of the time, but I'm being introduced as someone who does extraordinary things, so maybe I should explain that.

I'm going to try to explain that in the video that I'm going to show you now.

This is also the side with the lowest energy on a 3,000 square foot kite.

We're going back to the water droplets again, but thinking about the universe from a new perspective.

This kite was designed by a man named Dave Culp.

Why would you want a 3,000 square foot kite?

A kite the size of a house

Because you want to pull the boat very fast.

So I was preparing this with some people.

This is another way of looking at an abstract concept, where the structure is defined by the physical laws of the universe.

It can also be used as a bed sheet, but autonomous calculations define the aerodynamic shape.

A system like this could double the speed of a ship, which is another interesting aspect of the future.

(applause)

I decided to live beautifully from now on

(Laughter) People used to say, Norman is good, but if you do what he says, it's easy to use and it's ugly.

I didn't mean to do that...

Isn't this nice?

thank you for setting

purely wonderful

I don't know what this is or what it's good for, but I just feel like I want it.

that's my new way

To understand what beauty and charm and emotion are—

That's the new me. Making things nice and fun is my new theme.

This is a lemon squeezer designed by Philippe Starck for Alessi.

It's a lot of fun. It's in my house. It's on the front porch.

(Laughter) I bought the gold special edition, and it had a little warning in it that said, "Don't use it to squeeze lemons.

Acid hurts the gold plating."

(Laughter) So I bought a box of juice, poured it into a glass, and took a picture.

(Laughter) Look at that knife down there.

Global knife made in Japan

First of all, just looking at this shape is wonderful

And when you hold it in your hand, the balance is exquisite and comfortable

3rd is very sharp

I enjoy using it

So this one has it all

beautiful and functional

You can tell a story about this, and it's also ideological, and I have a theory about emotions.

These three are the elements

Yutaka Ishii's group at the MIT Media Lab put a projector on top of the ping-pong table so that it projected water and fish swimming in it onto the table.

When you play table tennis and the ball hits the table, water ripples spread and the fish escape.

But the ball hits the other side of the table and creates ripples again, and the poor fish have no time to rest.

(Laughter) Is this a good way to play table tennis?

Could it be fun?

of course!

Google screen

Searching for "emotion and design" returns 10 pages of results.

Google's logo has been stretched to match.

"Showing 1-20 of 73,000"

Instead of saying something like

very simple and subtle

I think a lot of people see this and don't realize it.

Your subconscious mind is aware of it and feels good about it, but you don't know why.

it's a good way

Best of all, if you search for "design and emotion," my website is the first thing that comes up.

(Laughter) The weird thing is that Google is lying to me.

then

If you search for "design emotion", my website is not the first.

becomes the third

well that's a different story

Here's a great review of the Mini Cooper from the New York Times.

It says, "As we all know, this car has a lot of flaws.

still to buy

There is no car more fun to drive than this."

When I looked inside the car... I really wanted to see it, so I rented it, let my son drive it, and took some pictures... I love the design inside the car.

round and cute

Great usability

This is my new style Fun is best

I really do believe that comfortable things work well.

For example, let's say you put a board on the ground

Imagine you're walking on a plank that's 60 centimeters wide and 10 meters long.

no problem at all

Now, what if that same board were to be placed 100 meters high?

I can't move my body due to intense fear

This actually affects how the brain works.

Paul Saffoe used to say that he couldn't decide what to say until the very last minute before he gave a talk, because anxiety was what kept him focused.

That's what fear and anxiety do. Depth-first processing, you might call it.

And don't let me cross the board

Some people can, like circus performers and construction workers.

But this is really a brain changer.

Psychologist Alice Eisen did a brilliant experiment.

to solve the problem

Gather the students in the room. There's a string hanging over here, and a string hanging over there.

The room is empty, just a table with paper and scissors and junk on it.

And I would call the students in and say, "I'm going to give you an IQ test to measure how well you're doing in life.

Can you tie the two strings here?"

You can grab one string and pull it, but you can't reach the other

I can't reach you no matter what

no one was able to solve

I put the next group in the room and said, "Before you start, I have a box of candy, and I won't eat it.

Do you like candy?"

Everyone liked candy, so I was happy.

and they solved the problem

It turns out that when we're anxious, neurotransmitters are released in our brains that encourage depth-first thinking.

When we're having fun -- it's called positive evocative -- the frontal lobes release dopamine, and the brain becomes more breadth-first problem-solving, more receptive to external stimuli, and more free-thinking.

It's like brainstorming

Brainstorming is fun, we play games together, we say, "Don't judge," and we come up with quirky, cool ideas.

But if it's always like that, it's going to slow you down, because halfway through, you'll be like, "Oh, I just got this idea."

So to get the job done, you have to set deadlines.

Then I get worried

The brain works differently, because when you're having fun, things work better because you're more creative.

Even if there is a small problem,

It's no big deal."

There is an instinct level in processing.

Through co-adaptation, we've learned to prefer bright colors.

Mammals and primates love fruits and bright plants, and eat the fruits to spread their seeds.

There's an amazing amount of stuff in your brain.

We hate bitter tastes, loud noises, hot and cold weather.

We don't like angry voices and frowns We like symmetrical faces And so on.

Instinct levels are like that.

Design can take advantage of this instinct level in many ways. When choosing a font, red can create a sense of vibrancy and excitement.

It's a 1963 Jaguar. It's actually a terrible car, and it's broken, but it's loved by its owner.

It's so beautiful that it's even in the collection of the Museum of Modern Art.

It's a water bottle. I'm buying this not for the water, but for the bottle.

After drinking water, keep it instead of throwing it away

It's decorated and filled with water like an old wine bottle, which means you didn't buy it for the water.

It's an instinctive experience

The middle level of processing is the behavioral level, and we do a lot of things at this level.

The instinct level is unconscious, there is no awareness

The behavioral level is also unconscious and there is no awareness

a lot of what we do is unconscious

I walk around the stage, but I don't try to control my feet

I do a lot of my speeches unconsciously, I rehearse and think about them well in advance.

a lot of what we do is unconscious

It's an automatic behavior. Mastery is something your body remembers unconsciously.

And in functional design, the sense of control is important, which includes usability and comprehension, but also weight and feel.

That's what makes global knives so great.

It's very well balanced and sharp and you really feel in control of the act of cutting.

Or blasting through difficult roads in a high-performance sports car, and here, too, there's a sense of complete control over the environment.

a sensual pleasure

This is a KOHLER "waterfall shower" with all the ledges underneath serving as shower heads.

You can shower all over your body at once. You can stay in the shower for hours. You don't waste water because the same dirty water is reused.

(Laughter) This is a really nice teapot that I found while dining at the Four Seasons Hotel in Chicago.

Ronnefeldt sleeping pot

It looks like a normal teapot, but when you use it, you lay it on its side, put tea leaves in it, and pour hot water over it.

Then the tea leaves are completely submerged in the hot water.

The tea leaves are on the right side, on the right side of this line.

There is a small protrusion inside, where the tea leaves can be placed and submerged in hot water.

When the tea is almost done, tilt it

The tea leaves are then partially submerged in hot water to complete the extraction.

When it's all done, stand up straight. The tea leaves are above this line, and the hot water is up to here, so the tea leaves won't be soaked.

This is communication, and it's about emotion.

Emotion is what accompanies action.

Being safe in the world

Perception is about understanding the world, emotions interpret it as good or bad, safe or dangerous, and they prepare for action, which is why muscles tense and relax.

That's why we can sense other people's emotions. Our muscles move involuntarily, and our facial muscles, in particular, have evolved to be so rich and expressive.

This pot has facial expressions so you can tell the waiter, "I'm done, this way... I'm standing."

A waiter will say when they pass by, "Would you like some hot water?"

Nice and nice design

The third level of processing is the reflective level, which is the part of the brain that doesn't control behavior like the superego, the part that doesn't control the muscles that aren't connected to the senses.

this is what's happening

It's a little voice in your head that observes and says, "This is good, that's bad."

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

This is the little voice in your head, the seat of your consciousness.

This is a great introspective product.

Hummer owners say, "I've driven a lot of cars, and I've had some that I've been attracted to, but none of them get as much attention."

The image of the car is more important than the car itself.

If you want a more positive model, you have this GM vehicle.

The reason I bought this car is because I care about the environment.

The early models are expensive and sloppy, but we still buy them to save the environment.

This is introspective design

And when you see this amazing luxury watch, you'll say, "I never thought I'd own a watch like that."

It's the exact opposite of this watch, although it's a purely functional watch that's probably more accurate than the $13,000 watch.

But it's ugly, like Donald Norman.

What's interesting is that people pit one's emotions against something else, the tactile fear of falling and the reflective state of saying, "I'm fine, I'm fine, I'm safe, I'm safe."

If the amusement park was rusty and crumbling, no one would want to ride it.

You're pitting one against the other.

Another interesting example is-

(Laughs) Jake Kress is a cabinet maker who makes these incredible pieces of furniture.

This is a chair with claws, and this poor little chair has lost its ball and is trying to get it back before anyone else notices.

The beauty of this is that people accept this story.

It's a great place for emotions

this is the new me

I will only say good things from now on.

(Laughter) (Applause)

I was interested in whether it was possible to develop a device like a "sixth sense," the sense of being able to easily access information that might exist somewhere else to help you make good decisions, or to "seek information," at any time.

Can I use my current mobile phone? Some people may think that

I do not think so

For example, you meet someone here at TED, and you shake hands with the person in front of you in this amazing network, and you don't say, "I'm going to look you up on Google on my phone."

Or you don't go to the supermarket and stand in front of a giant toilet paper aisle with all the different toilet paper rolls, pull out your phone, fire up your browser, look at a website and see which one is the greenest and buy it.

In a true sense, we still haven't been able to easily access the information we need and make the appropriate decisions about what to do next.

My research group at the Media Lab has made a series of inventions that give us access to this information in a simple way, without users changing their behavior.

I'm going to present you the latest and most successful results to date, which are still in development.

I'm actually wearing the device right now, and I built it in a snap from readily available parts.

It's a simple webcam, portable, battery-operated projector with a small mirror.

This communicates with the phone in your pocket, and it becomes a tool for communication and computation.

The video shows my student, Pranab Mistri, who is the quintessence of the entire process from design to implementation of this system.

And this system allows him to walk up to any surface and use his hands to interact with the information projected in front of him.

This system tracks the movements of four fingers

This time, as you can see, I'm using a simple finger sack.

If you want something more stylish, you can dye your nails a different color.

This camera basically tracks the movements of his four fingers and recognizes the movements of his body, so you can, for example, go to a map of Long Beach and zoom in, zoom out, and so on.

The system can also recognize everyday gestures, like taking a picture, and it can actually capture a picture of what's in front of you.

And then, back in the Media Lab, you can walk up to the wall and project the pictures he's taken and use natural gestures to rearrange them, organize them, resize them.

I'm sure some of you saw Jeff Hann's demo here two years ago, and you might think it's similar to Microsoft's Surface Table.

Yes, you can also use natural gestures to communicate using both hands.

The big difference is that you can use it on any surface. Any surface. If nothing else, you can use your hand.

This device is completely portable, and (applause) the key difference is that it's completely mobile.

An even more important difference is that it will be mass-produced, and in the future it will cost less than today's cell phones, it won't be bulky, and it will be more stylish than the version I'm wearing around my neck right now, like Tom Cruise's "Minority Report."

And the reason we're really excited, in addition to taking you into a cool fantasy world, is that this can really act as a "sixth sense," giving you relevant information about whatever's in front of you.

Pranab is going to the supermarket to buy some paper towels.

When he picks up the product, the system recognizes the product he is holding.It uses image recognition and marker technology.After recognition, a green or orange light will turn on.

Click it for additional information

In addition, it will tell you if this product is the right choice for his personal criteria.

Some of you may prefer bleached toilet paper to eco-friendly toilet paper.

(Laughter) When you go to a bookstore and pick up a book, you can see the ratings on Amazon, and they project it onto the cover of the book.

Rated 5 stars on Amazon

As Plenab flips through the pages, he sees even more additional information, including comments from readers and his favorite critics.

When you open a particular page, you can see the annotations made by the experts, giving you more information about everything on that page.

The act of reading newspapers will never go out of fashion.

(Laughter) Or watch a video commentary on the article you're reading.

See the latest sports scores

Although this may be controversial

(Laughter) At TED, when you start talking to someone, you'll see keywords (a tag cloud) appearing on their clothes, words related to them that appear on blogs and web pages.

Is this student interested in cameras?

On my way to the airport, I pull out my ticket and it tells me that my flight is delayed or my gate has been changed.

(Laughter) (Applause) So if you want to know what time it is, all you have to do is draw a simple clock shape on your wrist.

What we've done is that we'll have a constant stream of information from the things we face every day.

My student Prenab is the genius behind this device

(Applause) He's making this applause-worthy contribution.

I don't think his lover was having much fun either.

But it's not finished yet, it's in the middle of development

Maybe in another 10 years, we'll be presenting the ultimate "sixth sense" device that can be implanted in the human body.

thank you

(applause)

I had the opportunity to talk to 300 children aged 6 to 8 at the Children's Museum, and I brought a bag full of prosthetic legs like the ones you see here and laid them out on the table.

Children are naturally curious about things that are unfamiliar or foreign.

Adults instill fear, suppress children's curiosity, and interrupt questions so as not to be rude, so children become afraid of foreign things.

In fact, the teacher said to the excited children, "Emmy's feet, even if you make a mistake." "Don't stare."

But that's what matters

The purpose is to get people to touch the prosthetic leg

So I said to the teacher, "I want to talk to the children for just two minutes." "Without the adults."

The door opens and the kids flock to the prosthesis, pecking, toeing, and putting their whole body weight on the sprint prosthesis.

I asked, "I had a thought this morning." "I want to jump over a house." "It's a two- or three-story house."

"Kangaroo!" someone shouted

"No, no! Frog!"

"I like Inspector Gadget!"

"No! It's Mr. Incredible!"

until I've never heard of

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

They all said in unison, "Of course!"

(Laughter) In the eyes of a disciplined child, I would have looked disabled, but now I have a body with unknown potential.

I can become a superman

It's funny, isn't it?

I stood here 11 years ago

I've heard many times that TED changed their lives, and I'm one of them.

TED was the starting point for his later life explorations

At that time, I introduced a prosthetic leg that was epoch-making at the time.

A carbon fiber sprint prosthetic modeled after a cheetah's hind leg.

And these real silicone feet

Bringing together innovators beyond the framework of conventional medicine, aiming to create prosthetic legs that make full use of science and technology.

A good chance to stop pursuing them separately

Fortunately many people agree

It was also around this time that I learned about TED participant Chee Perlman, who must be at the venue today as well.

Qi was the editor of ID magazine at the time, and he featured me in the front page.

This was a big trigger

Exciting encounters were born one after another About the design of the cheetah prosthetic leg Inundated with requests for lectures from all over the world

After the lecture, men and women all gathered

And they say, "Amy, you're so attractive."

'I don't look very disabled'

Thinking in my heart that I've never felt that way

But this conversation made me realize that beauty can be explored.

What does a beautiful woman look like?

What is an attractive body?

What does it mean to have a disability from an identity perspective?

Even if Pamela Anderson's body is artificial

Don't call me disabled

(Laughter) The ID article went from graphic designer Peter Saville to fashion designer Alexander McQueen and photographer Nick Knight.

Three months after TED, we did our first model shoot in London, and that's the cover, with the headline "Fashionable?"

Three months later, she was modeling for McQueen, wearing a hand-carved ash prosthesis.

Audience mistakenly thinks they are wooden boots

This is the real thing, the stunning beauty of the grape vine and magnolia

poetry is important

Poetry turns the mundane and neglected into art

Poetry turns what people fear into something interesting, something they want to see a little more, something they want to understand.

Matthew Barney's "The Cremaster Cycle"

taught me that

I felt from the bottom of my heart that my prosthetic leg was a sculpture to be worn.

At that time, I was breaking free from the point of view of finding the ideal of beauty only in the restoration of humanity.

Known as a "glass leg," the prosthetic leg is actually made of transparent polyurethane, the same material used to make bowling balls.

It's heavy!

This is a prosthetic leg cast in the ground with potato and sugar beet roots and a brass toe.

This is the enlarged image

Next is a female upper body and a cheetah lower body A token of gratitude for the athlete life

After 14 hours of special make-up, I became a creature with real legs and claws and a flexible tail, like a gecko.

(Laughter) And here's another thing we co-created, which looks like a jellyfish leg, also in polyurethane.

Outside of cinema, the use of these feet is to appeal to the senses and stimulate the imagination.

Oddity is also important

I have more than a dozen prostheses. They are made by many people.

(laughs) I'm 185cm today.

A year ago, when I went to a party in Manhattan with something that I had been made by an orthopedic surgeon in Dorset, England.

A long-time friend who usually knows me who is 173 cm

He was surprised when he saw me, "You're so tall!"

I immediately said, "Hey! Interesting, isn't it?"

It feels like riding stilts on stilts What I didn't expect was to hit my head on the door frame

Even that was fun

And my friend says, "But Amy, that's cunning."

(Laughter) (Applause) It's a lie, but my friend was serious.

It's unfair to be able to freely change your height, isn't it?

At that moment, I realized that society's reaction had changed dramatically in the last 10 years.

Handicap is no longer something to overcome

Things that amplify positively

society is full of possibilities

Prostheses no longer replace what is lost

A symbol of the power that allows the wearer to create freely in the newly created space.

People who used to be disabled can now express their own individuality. By believing in their own potential and designing their bodies, they continue to create new personalities.

Now, I'm looking forward to seeing how, by combining cutting-edge technologies like robotics and bionics with time-honored poetry, we're beginning to understand the humanness of humanity as a whole.

If we want to reach our full potential as human beings, we need to celebrate the great strengths and the great flaws that we all have.

Shylock says in The Merchant of Venice, "If you prick me with a needle, you will bleed."

It's what makes us human, and all the potential within it makes us beautiful.

thank you

(applause)

In 1943, Allied planes soared over Nazi Germany, dropping tens of thousands of leaflets.

The leaflets, produced by an anonymous German, urged us to oust Hitler, to fight for the future, to keep hope alive.

This call rippled through homes and businesses, into concentration camps and prisons.

Until after the war, it was not known who the creator of the leaflet was, what his background was, or how he met his tragic fate.

Ten years earlier, when Hitler came to power, Hans and Sophie Scholl were teenagers in Forchtenberg.

At that time, fear, propaganda, and surveillance were invading every part of the lives of the Scholl family and hundreds of Germans, as Nazi rule extended.

Nazi Germany specifically targeted young people, establishing institutions to regulate their behavior and monitor their thoughts.

As a teenager, Hans was a member of the Hitler Youth, and Sophie was a member of the League of German Girls.

Hans held a high position and assumed the role of overseeing the training and indoctrination of young people.

In 1936, he was selected as the standard-bearer of the National Party Congress.

But it wasn't until the maddening rhetoric of Nazi rhetoric that he was skeptical.

Meanwhile, Sophie also began to doubt the information she was being given.

Parents Robert and Magdalene originally feared losing their children to Nazi ideology, leading their children to become more suspicious.

At home, Robert and Magdalene listened to radio stations from other countries, an act Nazi Germany initially claimed was un-German and later banned.

In Germany, after the state-run broadcasts vehemently denied Nazi atrocities, the Scholl family learned the shocking truth.

But the family could not escape the rule of Nazi Germany.

After the war began, Sophie reluctantly served the state, and Hans had to serve in the military while attending medical school in Munich.

At medical school Hans met C. Probst, W. Graf and A. Schmolel.

Nazi ideology feels creepier with each passing day.

medical students desperately wanted to have their say

But how can you spread your voice when you don't know who's on your side?

So they decided to hide their names and go into rebellion.

We put our money together and bought a printing press.

An acquaintance of mine offered me the basement of his atelier.

Work on creating a message has begun in secret.

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

The leaflet was signed "white rose."

The first leaflet denounced Hitler and called on Germans to refuse to work to keep the war going.

Remember, every citizen deserves the government they deserve! Such language was unprecedented at a time when acrimonious remarks could be considered treason.

Mostly written by Hans

1942 Sophie arrives in Munich, ignorant of her brother's activities.

I saw a leaflet at school soon after.

It wasn't until Sophie saw the evidence in Hans' room that she realized who created the leaflets.

Surprise soon turned into determination: "I want to participate too."

It was a time when the anger that had been swirling within the brother and sister for years was reaching its peak.

From June 1942 to February 1943, this secret organization was very active.

The Gestapo were looking for clues, but the "white rose" was always cautious.

As the war raged and controls tightened, the city of Munich was repeatedly bombed.

Even so, "White Rose" was aware of the danger and enthusiastically carried out secret activities.

There were times when I scribbled on buildings, and I bravely boarded trains full of Gestapo.

In the winter of 1942, Hans ventured to the Czechoslovak border to meet anti-Nazi resistance.

On February 18th, 1943, Sophie and Hans brought a suitcase's worth of leaflets to the college they were attending.

A janitor noticed what they were doing and reported it to the Gestapo.

The brothers and sisters initially quietly denied any involvement, but when the police scrambled up every single leaflet and placed it in an empty case, it fit perfectly.

Hans and Sophie confessed and were immediately put on trial and sentenced to death by guillotine.

Despite being subjected to grueling interrogation, he never revealed the names of his co-conspirators.

Before her execution, Sophie showed the world her anger at the state of Germany.

But at the same time, he spoke of a hopeful future, saying, "How can you believe that justice will prevail if no one sacrifices himself in the cause of justice?

On such a bright and sunny day I must go, but who cares if I die, If by our influence many people wake up and take action?"

it starts with a countdown

August 14, 1947 A woman in Mumbai gives birth around midnight.

Across India, people hold their breath, awaiting the declaration of independence from nearly 200 years of British rule.

And at exactly twelve o'clock, a writhing baby and two new nations were born at the same time.

From these events, "Midnight's Children," is a masterpiece by the Indian-British author Salman Rushdie.

The name of the baby, who is the same age as the new nation, is Saleem Sinai, the protagonist of this novel.

The story follows his 30-and-a-half-year life, moving back and forth between the past and the future, imagining the secrets of the Sinai family and dark mysteries.

The strangest of all is that Saleem has magical powers that are somehow related to the time of his birth.

And he's not alone in this phenomenon.

All children born around midnight have special powers such as Parvati, the witch of great magical powers, and Lord Shiva, the great warrior who is Salim's natural enemy.

Through telepathy, Saleem communicates with many other midnight-born children, including those who can walk through time and mirrors, children who change sex underwater, and multilingual conjoined twins.

Saleem becomes a hilarious narrator of all mystical events and (Indian) history.

His birthday is a day to celebrate, but it also marks the beginning of turbulent times in India.

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

At the same time as independence, the "India-Pakistan Separation" happened, an event in which Pakistan separated from India, which was under British rule, and became two nations.

This triggered war between the two countries in 1965 and 1971.

Saleem touches on these and other events, all the way back to Bangladesh's independence in 1971 and Indira Gandhi's government of emergency.

The epic composition of "Midnight's Children," running parallel to history, is why it's been called one of the greatest works of post-colonial literature.

These genres typically tell the stories of people who lived in colonial and former colonial countries, and explore the aftermath of colonization through themes of revolution, migration, and identity.

Born in 1947, like Saleem, Rushdie was educated in India and England, and is known for her historical backgrounds in far-flung countries, her political statements, and her magical realism.

Rushdie enriches Midnight's Children by drawing heavily on the cultures of India and Pakistan, ranging from family traditions to food to religion to folklore.

Under the watchful eye of his lover Padma, Salim's tales told throughout the night are reminiscent of The Thousand and One Nights, in which a woman named Scheherazade tries to survive by telling the king night after night stories.

As Saleem understood, the thousand and the one are the "number of nights, magic and parallel worlds" in the story.

Sometimes it's a roller coaster ride, a dynamic story.

Saleem says, “Who am I?

Anything that wouldn't have happened after I was gone if I hadn't appeared

And I'm not special in this regard. There are now more than 600 million people. Every "I" is in the same crowd.

I'll say it one last time: To understand me, you have to swallow the world." Saleem's narrative has breathtaking quality, and Rushdie draws on the cosmological consequences of life while questioning the condensing of history into a single narrative.

His outlandish stories and transformative characters have always captivated and admired.

Not only did "Midnight's Children" win the prestigious Man Booker Prize the year it was published, but in the 2008 contest, it was hailed as the best book, beating out 39 competing previous winners.

In a masterpiece of epic proportions, Rushdie tells us that there is no one truth, that it is wise to think that the world is manifesting itself in many different forms at the same time, experiencing many lives, experiencing different moments each time the clock ticks.

On his 20th birthday, identical twin astronauts volunteered to participate in the experiment.

Terra remains on Earth, while Stella gets into a spaceship.

Stella's spacecraft travels at 86.6% of the speed of light to a star 10 light years away and returns to Earth at the same speed.

While the twins were prepared to be separated, they wondered what would happen when they met again.

A light year is exactly the distance light travels in one year, so Stella's journey should take 23 years.

But the twins studied special relativity, so they know it's not that simple.

First, the faster an object is moving in space, the slower time goes by than a stationary observer.

This relationship is quantified by the Lorentz factor and defined by this equation

Also, the length of a moving object as measured by a stationary observer shrinks by the same factor.

At 86.6% of the speed of light, the Lorentz factor is 2, so time in the spacecraft is twice as slow.

Of course, Stella doesn't realize that time is moving slowly.

Because everything in the spacecraft that moves over time -- clocks, electronics, etc. -- moves slowly, including the rate of aging and even life, including Stella's own perception of the passage of time.

The only person capable of perceiving the slow passage of time for Stellar in a spaceship in motion is someone like Terra on Earth, in the inertial frame, the unaccelerated frame of reference.

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

but that's just one point of view

Because all motion is relative, Stella argues that the spacecraft is more stationary, and that the rest of the universe, including Terra, is moving relative to Stella.

In that case, time would go half as fast for Terra, and eventually Stella would be the older twin.

Neither can be older than the other, so which one is correct?

This seeming contradiction is known as the "twin paradox," but it's not really a contradiction. It's just one example of how special relativity can be misunderstood.

To test the theory in real time, the twins agree to flash the other after each year has passed.

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

A flash from Earth is measured at the same speed as a flash from a spacecraft, regardless of whether it's going out or coming back.

So when one of the twins observes a flash of light, what they're measuring is the time it took the other to experience a year, plus the time it took for the light to travel between them.

This process can be represented graphically

The x-axis represents distance from Earth and the y-axis represents time.

From Terra's point of view, the path is just a vertical line, with zero distance traveled, and one division on the line equals one year as Terra perceives it.

Stellar's path spans the range from the same origin to a point 11.5 years in time, 10 light years in distance, and 23 years later to return to a point at distance 0.

On Terra's first day, she sends a light pulse from Earth to Stella's spaceship.

It takes one year for light to travel one light year, so the path of light is a diagonal line with an inclination of 45 degrees.

And by the time the light catches up with her, Stella has moved further away from where she started, so a total of more than seven years for Terra and more than four years for Stella.

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

But now that it's moving toward the light source, the second flash will reach Stella in less time, and Stella will see the flash more often.

So, in the first half of the journey, Stella watches as she ages slowly, and in the outbound journey, she ages rapidly.

During that time, it seems to Stella that Terra, the stars she's heading to, and the whole universe are moving relative to her.

And because of the contraction, Stella sees it as if the distance between them has shrunk in half.

So, from Stella's point of view, it's only going to take about six years to get there and back.

Two years have passed for Terra when she sends her first signal to Earth.

Stella fires four more flashes on its outward path, with the location of the flashes moving away each time.

More than 21 years will have passed for Terra by the time she sees the first flash she shoots on her way home.

During the rest of Stella's return journey, Terra observes multiple flashes each year.

Terra observes that in the first 90% of the 23-year period, Stella ages more slowly than she does, and in the last 10%, she ages more rapidly.

This asymmetry explains why the paradox isn't really contradictory.

The twins witness each other's time speeding up and slowing down, and while for Stella it's 50/50, for Terra, Stella is drifting away, slowly taking over the majority of her time.

This is consistent with the time observed by the twins during space travel, which took 23 years on Earth, but only 11.5 years on the spacecraft.

By the time the twins reunite, Terra will be 43 and Stella will be 31.

The mistake in Stella's assertion was that she and Terra were both inertial observers.

An observer in an inertial frame must continue in uniform linear motion relative to the universe excluding itself.

Because Terra was stationary, her velocity remained at zero.

But when Stella turned around to make her way back, she transitioned into a different frame of inertia than she was in when she left.

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

As twins with an age difference of 11 years, they are a perfect example of special relativity.

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

The king tries to retreat, but the enemy cavalry coming from behind attack from the side.

escape is impossible

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

For more than 1,500 years, chess has been known as a tool for military strategy, a metaphor for human affairs, and a measure 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 another 100 years.

It is said that when the youngest prince of the Gupta dynasty was killed in action, his brother devised a way to present the scene to his grieving mother.

Using the 8-by-8 Ashtapada board used in other popular games, a new game has emerged with two main features: the rules for moving pieces are different for each type of piece, and the fate of just one king's piece determines the outcome.

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

But as it spread into the Sassanid Dynasty, it acquired its current name and terminology. "Chess" comes from "shah", which means king, and "checkmate" comes from "shamat", which means "the king is powerless." Chess was introduced to the Arab world after the Islamic conquest of Persia in the 7th century.

Transcending tactical imitation, it became the source of a wealth of poetic imagery.

Diplomats and courtiers used chess jargon to represent political power.

The ruling caliph turned himself into an avid player.

And the historian Masudy compares chess to a game of chance and sees it as a testament to man's free will.

Medieval Silk Road trade brought the game to East and Southeast Asia, creating many regional variations.

Instead of placing the chess pieces in the squares of the board, the Chinese placed them at the intersections of the squares, much like in Go, a unique Chinese tactical game.

What the Mongolian military leader Timur saw was an 11-by-10 game board with a safe zone called a fortress.

And in Japanese shogi, captured pieces can be used by the opponent.

But in Europe, chess has taken on a modern look.

By 1000 AD, the game was part of court education.

Chess was used as an educational analogy for each class of society to play their proper role, and the pieces were reinterpreted in new social contexts.

At the same time, the church remained suspicious of games.

Moralists warned against spending too much time playing games, and chess was even banned in France for a while.

Yet the game's popularity spread, and in the 15th century it transformed into what we know today.

The relatively weak pawn of advisor was replaced by the stronger queen, perhaps influenced by the rise of strong female leaders at the time.

This change accelerated the game's momentum, and as other rules became more popular, papers emerged that analyzed how the game generally begins and ends.

chess theory was born

With the advent of the Age of Enlightenment, chess moved from the royal court to the coffee house.

During this period, chess was viewed as an expression of creativity, encouraging bold moves and dramatic moves.

This "romantic" style culminated in a match in 1851 known as the "Game of Immortals," in which Adolf Andersen managed to checkmate at the expense of the Queen and both rooks.

But the advent of formal competition in the late 19th century showed that tactical calculation trumps dramatic intuition.

And with the rise of international competition, chess has taken on new geopolitical importance.

During the Cold War, the Soviet Union devoted enormous resources to cultivating chess talent, and then held a monopoly on champions until the end of the 20th century.

But it was IBM's computer called Deep Blue that really upended that Russian monopoly, not the people of other countries.

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

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

But like the game itself, which machines mastered, these machines are the product of human ingenuity.

And the apparent checkmate will probably be surpassed by this originality.

55 B.C. As the sun rises in the autumn morning, Chama offers the two pigeons in the center of the village to the altar.

She prays to Matrona, goddess of the earth, and to Lugus, chief of the gods.

Then he twists the bird's neck, cuts it open, and peers into its internal organs to read a message from God.

cama is a druid

Druids perform religious ceremonies, act as judges, healers, and scholars, teach children, and mediate disputes between Celtic tribes.

She began her studies as a child and memorized the vast amount of information she needed to fill her many roles, because druidic knowledge was considered sacred and not recorded in books.

Like many other druids, she spent years studying in Britain.

Today, she serves as a druid for the Veneti tribe, in a small farming village near the west coast of Gaul, in what is now France.

After returning to Gaul, he received many marriage proposals, but at least for now he decided to concentrate on his work.

There was a disturbing omen this morning

I've been hearing similar messages over the past few months about war and strife.

A neighboring tribe, the Lidone, attacked our village and stole our cows in broad daylight twice this fall.

children gather to watch her work

Chama plays the lyre and sings

He told me stories of mighty kings who once ruled this land, and stories of brave soldiers who died naked in battle, and told me that one day, like all Celts, they would be reborn.

When the children return to help in the fields, Chama travels through the village to visit an old woman with a sick eye.

On my way to my grandmother's hut, I pass men salting pork for winter food, and women weaving cloth from dyed wool.

Chama delivers a remedy to a wounded eye, made from mistletoe, a sacred healing plant that, if misused, can be lethal.

From there, Chama visits the Chief to discuss the revelation.

She persuaded neighboring tribes to visit and discuss the matter.

I took a few warriors with me through the woods and demanded a meeting outside the walls of the Lidone village.

A representative of the Lidne tribe brought their own druid, a druid Chama had met at the annual meeting in Central Gaul where druid leaders were elected.

The chieftains soon start arguing and threatening each other.

Chama intervened between the two opposing sides to mediate to stop the quarrel.They must respect Chama's authority.

Eventually, the Lidone tribe agreed to give some of the cattle to the Chama tribe.

Despite the resolution, Kyama feels uneasy on the long way home.

As we approach the village walls, there are bright lights in the sky. Another omen. What is the omen?

Back home, the cama gathers with the elders for a dinner of porridge, a little meat and a glass of wine.

I received a document that I seized while I was out during the day.

Chama immediately understood the words of the document.

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

From the documents she learns that the Romans are approaching their land.

Some elders suggested that we should flee to the nearby hills and hide, but Chama advised us to believe in the gods and stay.

But there was a hesitation in my heart

The arrival of the Romans may limit what she can do.

Unlike other Celtic tribes, the Roman legions ignore the druids' divine role as mediators.

Before she goes to bed, she observes the motion of the planets, consults a star chart, and analyzes the meteor she just witnessed.

Every omen seemed to herald the approach of a greater threat than the neighboring tribes.

So let's get started, let's talk about play.

On February 17th, it's significant that the New York Times put an article about play on the front page of its Sunday edition.

At the bottom of this page it says “For both men and women

Serious and dangerously fun

And what creates a new theory of evolution.”

Not bad, but if you look at the cover, something is missing.

where are the adults?

Let's go back in time to the 15th century

This is a painting of a European courtyard with 124 different ways to play.

Solitary play, physical play, games, and teasing for young and old alike

It's all pictured here.

Our culture seems to have lost something important

Now, I'd like to tell you about an astonishing event.

The Hudson Bay area north of Churchill, Manitoba, Canada is still ice-free in October and November.

This 550 kilogram male polar bear is wild and very hungry.

German photographer Norbert Loessing photographed an Eskimo dog on a leash.

Suddenly, from the left, a wild male polar bear appears, with prey-seeking eyes.

Anyone who's ever been to Africa or been chased by wild dogs will know that those eyes are dangerous.

But the female Eskimo dog in front of its prey-seeking eyes wags its tail and makes a playful bow.

Then something unexpected happens

Routine behavior that should have ended with a polar bear meal changed.

This polar bear stands up. It has no claws and no fangs.

The two begin a wonderful ballet

play ballet

It's the world of nature, and you've subverted your carnivorous instincts to avoid the otherwise deadly battle.

If you look carefully, the Eskimo dog is peeping at the polar bear, and the two of them are in an unusual state.

is in play

In this state, these two are exploring possibilities.

They start doing things they couldn't do in the absence of play signals

What this wonderful example shows is that the laws of nature that we all share have the power to overcome the barriers of survival.

Let me tell you how I got into this business.

John said he used to study murderers, and that's right.

The shooting at the University of Texas really surprised me, and when I took a closer look at the perpetrator of this tragic, random murder, I found that, in relation to play, this perpetrator had a remarkable lack of sense of play.

The killer was named Charles Whitman

A panel of authoritative scientists investigated and concluded that the lack of playfulness, the suppression of the playfulness that is so essential in adolescence, was the underlying cause of the tragedy.

The findings are still compelling, and unfortunately, the Virginia Tech tragedy speaks for itself.

In another study of people who were prone to commit crimes, I realized the importance of play, but I still didn't understand the nature of play.

After studying the history of how people play for a long time, I think I've finally come to understand the nature of play that I didn't understand.

I don't think anyone fully understands the game yet.

But I think the perspectives that I'm about to explain help us to categorize play and give us some solid ideas.

This picture is the starting point for human play.

When the mother and baby meet their eyes, when the baby can make a friendly smile, the mother will naturally be filled with joy.

She whispers sweetly in baby talk, smiles and imitates babies.

If you hook them up to an electroencephalograph, you'll see that the wavelengths of the right hemispheres of the brain are in harmony, and thus we've gradually come to understand the physiology of the initial, gratifying state of play.

All complex play is thought to have evolved from this baby's way of playing.

Now I'm going to talk about one way of looking at play, but there's more than just one kind of play.

Physical play Explore the natural desire to defy gravity

this is a goat

Try this on your unlucky day, jump up and down, wiggle your body and you'll be energized.

You'll feel the same as this kid, he's just playing

The great thing about play is the lack of purpose

If purpose is more important, it's probably not play.

There's another kind of play: playing with objects.

This Japanese monkey made a snowball and is going to roll it down a slope.

I'm not going to throw it at another monkey, that's basic flirting.

As the human hand manipulates objects, the hand is trying to connect with the brain. The brain is trying to connect with the hand.

There was a talk this morning about the Jet Propulsion Laboratory (JPL), which is a wonderful facility.

JPL hired two consultants, Frank Wilson and Nate Johnson. Frank Wilson is a neurologist and Nate Johnson is a mechanical engineer.

Johnson was teaching mechanical engineering at a high school in Long Beach when he noticed that his students' problem-solving skills were declining.

He investigated why, and he concluded that students who were unable to complete a task like fixing a car had little hands-on experience.

Frank Wilson wrote a book called "Hands"

Both were hired by JPL

JPL, NASA, and Boeing, when they hire researchers and engineers, they don't consider even the brightest Harvard or California Institute of Technology students to be problem solvers if they haven't fixed cars or made things with their hands or played with their hands since childhood.

So play is practical and very important.

Play comes from curiosity and exploration (Laughter), but it has to be a safe exploration.

This will be fine This boy is interested in the human body. He's a mother.

Curiosity Inquiry is part of play

If you want company, you need social play.

Social play is one of the points we're talking about today, and it's a by-product of play.

scuffle play

These lionesses look like they're fighting from a distance.

If you look closely, it's the same as a polar bear and an Eskimo dog. It doesn't have protruding claws or bristling hair.

The game of wrestling is good study material for us.

Kindergarteners, for example, should be free to jump, punch, whistle, scream, freak out, and develop the emotional regulation and social co-products -- cognitive, emotional, and physical -- that they've learned through them.

Watching play, ritual play is part of our play.

If you're from Boston, you know it's a priceless moment when the Red Sox won the World Series.

Look at the expressions on the faces and bodies of the people in the photo.

imaginative play

I love this picture, it's my daughter, she's almost 40, and it reminds me of her kindergarten stories, her imagination, her ability to spin threads.

A very important element of play is creative solitary play.

I love this photo too, because it shows the real human being.

We humans have our own stories in our hearts

Our brain's unit of comprehension is the story

today i'm talking about play

I think this Bushman is saying that the fish he missed was this big. Exaggeration is one of the basic elements of play.

So how does play affect the brain?

It really affects me

The effects of play on the human brain are not well understood, partly because we don't have enough funding for research.

I went to the Carnegie Science Foundation to apply for a grant.

When I did my research on drunk driving crimes, I got a big grant, and the results were good, so it was a good relationship.

That was a few years ago, and I think it was an outdated way of thinking, but now it's all about play, thanks to science.

Play is the best way to activate the brain

Three-dimensional play activates the cerebellum, provides a lot of stimulation to the frontal lobe that controls decision-making, and develops associative memory, etc.

So for me, as a scientist, it's very rewarding to work together on the neuroscience of play, and to involve people from other disciplines who may not have been involved in the study of play.

It's also the goal of the non-profit National Play Organization, which was founded.

This is one of the play research methods, a 256-electrode electroencephalograph.

It's a pity that the subject's face is somber, but this device provides the mobility that is essential for research.

And now there's another study underway about mother-baby play.

Another reason I'm showing you this picture is to organize my thoughts on play.

In the animal world there is a routine play

In the animal world, if we take the rat as an example, young rats play instinctively in certain ways, like chirping, wrestling, groundwork. What happens if we suppress that play?

We let one test group of rats stop playing, leave the other group free, and give them cat-scented collars, and both instinctively run away and hide.

You're smart, you don't want a cat to kill you, right?

what next?

both hid

But the group that didn't get to play got stuck in their hiding place and died.

The group that played gradually explores its surroundings and tries out the objects around it again.

What this tells us, at least for rats, by the way, is that they have the same neurotransmitters as humans, they have similar cortical structures, and play is a matter of life and death.

I have a lot of other animal studies that I can talk about.

Now, this is the result of play deprivation.

Pets, livestock, and even rats have been shown to not develop their brains normally when they're deprived of play.

Our conclusion is that the opposite of play is depression, not work.

Imagine a life without play No humor No play No movies No games No fantasy No life

Whether you're an adult or a child, imagine a culture and a life without play.

The hallmark of our species is that it's designed to play all its life.

we can all signal to play

You know what I mean with this dog that was photographed at Carmel Beach a few weeks ago?

After this movement, there is always play.

There is no mistake

Human trust is built through play signals

But as we grow older, we forget our play signals.

It is unfortunate

still have a lot to learn

In this photo, Jane Goodall has a "play face" with a chimpanzee.

Play signals are voice, face, body, gestures, etc.

You see, when group play begins, it's very important that the group members feel safe while exchanging play signals.

You probably don't know this word, but it's as important as our biological names.

Larval reproduction means that immature traits are retained in adults

Anthropologists and numerous studies have shown that we humans are the most larval-reproductive, the youngest, the most adaptable, the most flexible of all living things.

That's why we're the best playboys

They are more adaptable than other organisms.

I'm going to explain another way of thinking about play, namely the history of play.

Your personal play history is unique, and you probably haven't given it much thought.

This is a book written by Kevin Karol, the ultimate playboy.

Kevin Carroll grew up in a very difficult situation: an alcoholic mother, an absent father, lived in a Philadelphia slum, was black, and took care of his younger brother.

One day, when I saw the playground from the window of the closed room, a strange feeling welled up in my heart.

he chased the feeling

And his life changed. From his humble beginnings, to what looked like prison or death, he became a linguist (professional basketball), a 76ers trainer, and an advocacy activist.

He says play changed his life

Now let's look at another play history in progress.

When you look back at Al Gore's memorable presidential campaign, when he was vice president and then lost, many of you might recall that he was cold and uncharacteristic, at least in public.

Looking at his published biography, it seems to me, as a psychiatrist, that his life was doomed.

Spend the hot Tennessee summers working hard

He shouldered the expectations of his senator father and Washington

I think he definitely has the ability to play, but I think his personality wasn't fully developed at the time compared to how he is now, because he didn't listen to his passion and his inner strength.

So what I'd like to encourage you to do is look back on your life, remember when you were a little kid, and think about the most vivid, fun, and playful moments you've ever had: a toy, a birthday, a trip, whatever.

Think about how you felt that day and how it affects your life today.

Maybe they will change jobs.In fact, many of the people I counseled changed their jobs as a result of developing their individuality through their own way of playing.

Or maybe you can make your life richer by reviewing and prioritizing your individuality.

We work in groups, and this is a picture of the "From Play to Innovation" course at Stanford University's School of Design, thanks to David Kelley and many others, "From Play to Innovation".

The goal of this course is to explore the state of play and the importance of imagination in humans by creating the same conditions as a polar bear and an Eskimo dog.The purpose of this course is to examine the state of play and the importance of imagination in humans by creating the same conditions as a polar bear and an Eskimo dog.

It's our maiden voyage, so to speak.

It's been about 3 months and I'm very happy

This Labrador has taught me a lot about play, and is a very old and battered professor (myself).

Brendan Boyle and Rich Crandall, and on the right side is neurologist Stuart Thomson, a prospective Nobel Prize winner with George Smoot.

Together with IDEO's Brendan, we're watching students act out the principles of play from the edge of the classroom.

One of the students' projects is to find out what's making meetings boring and try to fix it.

What I'm going to show you is a student-made film.

"Flow" is the psychological state that emerges when you're passionate about what you're doing.

It is characterized by vigorous focus, full engagement and success in the process of action.

The problem with meetings that we've experienced is that we have one meeting after another, and each one interrupts our work.

Meeting attendees don't know when they'll be able to return to work they've left behind.

that's not good

(MUSIC) In the design department, smart students sometimes designed meetings where furry dogs would take off as soon as they were done.

As soon as I take off this meeting, I can regain my sense of security

Because you can literally hang the meeting in your closet for when you need it again.

detachable conference

As soon as you put it on, you can have a fun, rich and useful meeting.

But the moment you take it off, the real action happens.

(Music) (Laughter) (Applause) What I'd like to encourage you to do is to live differently -- instead of intentionally separating work from play and setting aside time to play, let's live every minute of our lives, merging them with physical, physical, social fantasies, metamorphosis, and other forms of play.

I think that will lead to a richer life.

thank you

(Applause) I have a feeling that some people who hear what you're saying will misunderstand, that the lay psychology interpretation of this study is that perhaps for animals and humans, play is a rehearsal for becoming an adult.

This interpretation is very wrong.

Yeah, I don't think that's right. I think animals taught us that.

If you stop letting your cat play -- we all know cats love to play with small things -- stop it. The non-playing cat hunted just as well as the playing cat.

On the other hand, children who pretend to be King Kong or pretend to be car race drivers or firefighters don't all become race car drivers or firefighters.

So there's a big difference between the popular interpretation of play as a rehearsal for the future and the interpretation of play as a special biological phenomenon.

Four or five years of chasing animals has transformed my perspective from being a regular practitioner to what I am today, the idea that play is as important biologically as sleep and dreams.

In the biological study of sleep and dreams, we've found that animals sleep, dream, and do things like review to improve their memory, so sleep and dreams are very important.

For mammals and animals with well-developed nerves, the next evolutionary step after sleep and dreams is play.

The fact that polar bears, Eskimo dogs, magpies, bears, you, me, and my dog ​​can play together across species shows that play is a special phenomenon.

It's very important for learning and brain development.

So it's not just about playing in your spare time.

As a scientist, like any other researcher, you have to justify yourself by making recommendations to secure funding.

How do you prevent other scientists and the media from misinterpreting things like this, like Mozart's parable, MRI results prove that play enhances intelligence?

So if you get the kids together and put them in a pen and let them play for a few months, they'll all be geniuses and they'll go to Harvard.

Aren't you afraid that people will misunderstand your research and act like this?

The only way that I know of is to do more research and accumulate and expand the correct knowledge, whether it's improvisational play, clowning, or whatever, by showing play.

then people will understand the play

On the one hand, we bring together leading scientists from other fields, along with fMRI expert Frank Wilson and neuroendocrinologists.

And then we'll all come together and study play, and we'll all take the results seriously.

Unfortunately, the research is inadequate, and no one, including the National Science Foundation, the National Institute of Mental Health, has taken it seriously.

There's nothing about play that you hear about in cancer or heart disease research.

But I think play is as fundamental and long-term important for survival as learning the basics of public health.

Thank you very much Dr. Stuart Brown

(applause)

time flies so fast

Exactly 20 years ago, I invented the World Wide Web because I wanted to reshape how we use information and how we work together.

And now, 20 years later, at TED, I'd like to invite you all to help us rebuild the new.

Back in 1989, I wrote a proposal for a global vipertext system.

no one paid much attention to it

But 18 months later, this is how innovation happens, 18 months later, my boss allowed me to work on this project as a side project because of the inspection of the new computer we got.

And he gave me time to code

So I've created a rough snippet of HTML, including a hypertext protocol called HTTP, and the concept of URLs, which are names that refer to things that start with "http".

I wrote the code and published it outside

why did i do this

It's basically due to stress.

I was frustrated, and I was working as a software engineer in a huge, exciting lab with a lot of people from all over the world.

They brought a wide variety of computers to the laboratory.

They used different data formats and different document systems.

So in the presence of all that diversity, if I wanted to make something out of it, I would have to hook it up to a new machine, or learn to run a new program, or find the information I wanted in a new data format.

and these are all incompatible

it was very frustrating

It's the frustration of the possibilities that open up

In fact, there were documents in those hard disks.

Like the Internet, if it were on some big virtual document system somewhere, you wouldn't have to go through a lot of trouble.

Once you get an idea like that, it's something that captures your heart.

In the margin, written in pencil, "I don't know, but it's interesting."

(Laughter) But in general, it was a very difficult thing to describe the Web, and now it was difficult back then.

It's harder to explain

But like when TED started, the web didn't exist, and the act of clicking, for example, had a different meaning than it does today.

Show someone a hypertext page with a link in it, click on the link, and they'll see another hypertext page.

not very good looking

Some CD-ROMs also contain hypertext

The hard part was getting them to imagine that they could link to virtually any document they could think of.

This was a difficult conceptual leap.

Well, some people accepted

It was hard to explain, but there was a grassroots movement.

And that's what made this thing the most interesting.

What excites me most is not the technology itself, nor what people are doing with it, but the community that comes out of it, the spirit of people coming together.

It was like that back then

Interestingly, the situation is still becoming the same as it was then.

I was kind of asking you guys, "Put your documents on this web."

and everyone did

thank you

It's been amazing

I think it turned out to be pretty interesting, because what happened on the web really blew us away.

They went far beyond what we imagined when we started our first website.

Next, I would like you to put your data on the web.

There is still great untapped potential here

People still have a lot of frustration because their data doesn't exist as data on the web.

What is data anyway?

What is the difference between documents and data? Documents are reading material

You can read it, you can follow the link, but that's it

On the other hand, with data, you can do a lot of things.

Has anyone heard Hans Rosling's lecture?

One of the most amazing, yes, I'm sure many of you have seen, was one of the most outstanding TED Talks.

Hans from this presentation shows different countries in different colors, and he shows income levels on one axis and child mortality on the other, and an animation of the passage of time.

With these data, he used his presentation to dispel the assumptions people had about the economies of the developing world.

he introduced a slide like this

All the data is in the basement, and the data is drawn as a boring brown box, but that's what people think it is.

This is because data cannot be used as it is. But in fact, when someone creates something based on that data, data has a great impact on our lives.

In this case, Hans combined data that he found through various United Nations websites and elsewhere.

He combined the data together to create something far more interesting than the data in isolation, and he made this wonderful presentation by putting it into this software that I believe was developed by his son.

And Hans said, "It's important to have a lot of data."

And I was very happy to see at the party last night that he was still very strong and talking about the importance of having a lot of data.

So I'd like to ask you to think of a world where you don't just connect two or six pieces of data like he did, but where everyone puts data on the web, and virtually anything you can think of is on the web. I call this Linked Data.

This technology is very simple

There are three rules for putting anything on the web: First, it must have an HTTP name that starts with "http:", and from now on, it's not just for documents, but for what's written in documents.

We use it for people, places, products and events.

Various concepts will be represented in HTTP.

The second rule is that if I search on the web with this HTTP name and get data from the web using the HTTP protocol, I can get the data in a standard format with useful information about things and events that people want to know about.

who will be out? It's about the person, the place where they were born, etc.

So you can get important information

The third rule is that once you have that information, you can get not only about the person themselves, but also about their height, weight, place of birth, etc.

data is related

Interestingly, the data represent associations

This person was born in Berlin Berlin is in Germany

When an association is asserted, we can get the name of the association that begins with HTTP.

I can look up that information

I can look up the person, then find the city they were born in, find out the districts, towns, population, etc. of that city.

I can see through

Easy, right?

This is Linked Data, some years ago

I wrote an article called "Linked Data," and then things started to take off.

This Linked Data is an image of how Hans showed us that we have a lot of boxes and a lot of sprouts growing out of them.

More than just a lot of grass

Rather than being the roots of a single grass, each plant, whether it's a presentation or an analysis, can see all the data and piece together the data for anyone looking to find patterns in the data.

Linked Data

The meme was released into the world

Not long after, Chris Bitzer of the Free University of Berlin, who was one of the first to publish something interesting about this, turned to Wikipedia, which you know, is an online dictionary full of interesting documents.

Those documents have little boxes

Inside those infoboxes is data

He wrote a program to extract that data from Wikipedia and put it into a Linked Data node on the web called Dbpedia.

Dbpedia is represented by the blue blob in the middle of this slide, and if you actually look up Berlin, you'll see that there's a lot of other Berlin-related data that's connected to each other.

If you get data about Berlin from Dbpedia, you can pull other information as well.

And to my surprise, it started to grow

This is also a purely grassroots movement.

Let's do some thinking about the data

Data exists in many forms

Think about the diversity of the web, and it's very important that the web allows different kinds of data to be placed freely.

Various data can be introduced

We have government data, but we also have very important corporate data. We have scientific data, we have personal data, we have weather data, we have data about events, we have data about speeches, we have news, we have everything.

To give you an idea of ​​the diversity of the web, and to give you an idea of ​​the sheer amount of data that could be unlocked, I will just mention a few.

Let's start with government data

Barack Obama said in his speech that the US government data will be made available on the Internet.

I would like the data to be published

that's important why

It's not just for transparency. Of course transparency is important, but that data is aggregated from every agency in the government.

it's really useful and worth it

can be used in your company

It can also be used by children to do their homework

So it's about making the world a better place by making this data available.

You know what government agencies do with their data, and they tend to hoard it instead of making it public. Hans calls this "database hoarding."

They hug the database and don't show it until they have a beautiful site.

I'm not saying, rather than do that, yeah, make a beautiful website. Don't make it beautiful.

Please make a beautiful website, but first, give us raw data, untouched by us. That's what we want.

I would like the raw data to be made public.

I must tell you that I want you to release the raw data now

Let's practice saying it together

Tim: "Raw"

Venue: "Raw"

Tim: "data"

Venue: "Data"

Tim: "Right now!"

Venue: "Right now!"

Tim: Yes, "raw data, now!"

Venue: "Raw data now!"

Please practice it because we are paying for it as taxpayers and they have a lot of excuses and they keep the data and they don't release the data to you, so this word is very important.

and this is happening all over the world

Of course, it's not just about governments, it's about companies too.

I want to talk a little more about my thoughts on data

Here at TED, I'm always conscious of the big challenges facing human society today: understanding the brain to cure cancer, treating Alzheimer's disease, understanding the economy to make it more stable, understanding how the world works.

Academics trying to solve these problems have ideas in their minds and exchange information via the web.

However, most of the current human knowledge resides in databases, mostly in computers, and not really shared.

In fact, for example, if you're looking for information about drug discovery in Alzheimer's disease, you'll find that a lot of Linked Data is being made public, because scientists in that field have historically stored their genomic data in one database and their protein data in another, and they've realized that it's time to release that information.

Now they've made it Linked Data, and they can ask questions that they couldn't ask before.

“What proteins are involved in signal transduction and pyramidal nerves?”

Let's google this question

Of course, no page exists to answer this question, as no one has asked this question before.

223,000 pages were hit, but there was no reference page

Next, when we query the Linked Data system, we get 32 ​​hits, all of which are proteins that have the properties we are asking about.

As a scientist, being able to ask questions that really cross different disciplines like this, that's a big change.

that's very important

Scientists are completely stuck in front of data collected by other scientists and isolated from the outside world, and need to be freed to tackle big problems.

You probably think that all data comes from huge research institutes and has nothing to do with individuals.

but that's not

Data comes from our lives

Go to your favorite social networking site and say, "This person is my friend."

Data is born with the “Ching!” relationship

If you say, "This picture was taken of this person," you will say, "Chang!" This is also data Data, data, data

Every time you do something on a social networking site, that data is captured and used by the site to make life more interesting for other people on the site.

Even so, if you go to another site that uses Linked Data, for example, if you have a travel-related site, even if you want to send this photo to everyone who belongs to that group, you can't send photos between sites.

There are complaints that are being talked about in The Economist and on many blogs.

The way to break down this wall is to have interoperability between sites.

With Linked Data you can

The last story I'm going to tell you is probably the most interesting one.

Before coming here I used OpenStreetMap which is both a map and a wiki

If you zoom in on this square, it's the theater we're in now, the Terrace Theater.

Using edit mode, I selected this theater, added a name to the bottom, and saved

If you go back to this OpenStreetMap.org again, you'll see that this place is named after the Terrace Theater.

I did it!

I named the map!

I put it on, what do you think?

This city map, like me, is created by everyone, little by little, adding to it to create an incredible resource.

And that's the essence of Linked Data

People provide some information, and it all connects.

That's how Linked Data works

You and others provide their own information

Even if you don't have a lot of data yourself to put on the web, you can still ask

we practiced it

So this is Linked Data, which is incredible.

I've only scratched the surface for you so far. There is data in every aspect of our lives, whether we work or play, but it's not the number of locations where data is generated that matters, it's how we connect them.

It's the power that comes from stitching together data that the web as a document just didn't have.

Out of this comes truly tremendous power

Now is the time for those who think this is a great idea to act.

There are a lot of people at TED who do things, even if they don't have an immediate return on investment, that only when everyone else does.

This is Linked Data

I want you to make this

I would like to request this from you

That's my idea to spread to the world

thank you

(applause)

[This talk is for mature audiences.] Five years ago, I got a phone call that changed my life.

I remember that time clearly.

It was about this time of year and I was sitting in my office

the sun was shining through the window

the phone rings

When I came out, it was two federal agents who had found a lot of child sexual abuse images on the Internet and wanted help identifying the girl in them.

They had just started the case, and all they knew was that the abuse of the girl had been broadcast around the world for years on a site on the dark web that specialized in child sexual abuse.

The abuser was a highly skilled abuser, and with new images and videos coming out every few weeks, he had very few clues as to who the girl was and where she was.

These federal agents called because they heard we were a budding nonprofit that was developing technology to combat child sexual abuse.

But our organization was only two years old, and our only track record was child sex trafficking.

I had to tell you that we can't do anything.

We had no way of working together to stop this abuse.

It took another year for the Bureau of Investigation to find the girl.

By the time the girl was rescued, hundreds of images and videos of her rape had gone viral, from the dark web, to peer-to-peer networks, private chat rooms, and even the websites you and I use every day.

Today, the girl is still struggling to recover, living in the reality that she is being watched sexually abused by the world.

I've learned over the last five years that this incident is not particularly rare.

How did this society come to be like this?

In the late 1980s, there was a time when child pornography -- basically pictures and videos of child sexual abuse -- was about to disappear.

New laws and an increase in criminal prosecutions have made mail transactions too risky.

Then, with the rise of the Internet, the market exploded.

The amount of content in circulation today is enormous and growing.

This is truly a global problem, but if you look only at the United States, last year in the United States alone, 45 million child sexual abuse images and videos were reported to the Center for Missing and Exploited Children, which is about double the number from the year before last.

The details behind these numbers are daunting: more than 60 percent of the images appear to be of children under the age of 12, most of them severely sexually assaulted.

Perpetrators are celebrated in chat rooms dedicated to child abuse, where the more they abuse, the more victims they have, the higher they rank and become famous.

In such a market, the content itself becomes the currency.

Abusers are quick to adopt new technology, and it's clear that we're slow to respond.

Perpetrators don't read website terms of service, and content knows no borders.

There's no chance of winning if you go through each piece piece by piece, but that's exactly what we're doing right now.

Police only operate within their jurisdiction

Companies only look at their platform

Any data you get that way is rarely shared.

Of course, such disjointed efforts will not produce results.

We have to rethink our response to the bad trends of the digital age.

That's what Thron does.

We're building technology to connect organizations, giving law enforcement, NGOs, businesses and other frontline responders the tools they need to remove child sexual abuse images and videos from the internet.

I want to talk to you -- (Applause) Hi.

(Applause) It's about connecting the dots.

You can imagine how tragic that content is.

I don't want to see it if I can avoid it

So many companies with content and law enforcement convert each file into a unique number.

This is called a "hash"

It's essentially a fingerprint for each individual file or video.

The hash allows us to use that information for investigations or for companies to remove content from their platforms without having to look inside each image or video.

The problem now is that there are huge numbers of such hashes stored in independent databases around the world.

Each database will be useful to the organization that manages it, but how many are unique if the databases aren't connected?

We don't even know which children have been rescued and which are being identified.

So the first basic premise is that we have to connect all the data.

There are two places where software can make a big difference by connecting data globally.

The first is the police, which can help police quickly identify new victims, stop abuse, and stop content production.

Second, companies use hashes as clues to identify the millions of files in circulation today, remove them from their sites, and block new content from being uploaded before it spreads.

Four years ago, when the case was closed, our team sat down and just felt very frustrated.

I couldn't help but feel that way, because I had been looking at it for a year while I was looking for that girl.

I've seen all of the crime scenes under investigation, and with the right technology, the girl would have been found sooner.

That's where we started. We decided to do the only thing we could do. We started developing software.

first worked with the police

Our dream was to have a notification sound on the desks of police officers around the world, so that if someone posted a new victim online, they could immediately start searching.

I can't give you the specifics of that software, but it's currently in operation in 38 countries, and it's reducing the time it takes to protect children by more than 65 percent.

(Applause) Our next goal is to develop software to help companies identify and remove abusive content.

what kind of company

Last year there were 45 million calls in the United States alone.

The callers were only 12 companies.

Twelve companies reported 45 million child sexual abuse files.

These companies have the money to develop mechanisms to remove such content.

Many other small and medium-sized businesses around the world also need that capability, but either they don't think their platform will be used for abuse, or they don't have the money to invest in something that isn't profitable.

So that's what we're developing for these companies, and the more companies we work with, the more powerful this system becomes.

Let me give you an example

Our first partner is Imgur, and if you don't know it, Imgur is one of the most visited sites in America, and we receive millions of image uploads a day from users who are passionate about making the Internet a more enjoyable place.

We first worked with Imgur

We ran the system, and in less than 20 minutes, it attempted to upload known abusive content.

Imgur was able to stop it, delete it, and report it to the Missing and Exploited Children Center.

Not only that, but we also looked at who the account was uploading that content to.

Hundreds of previously unknown child sexual abuse videos have been found.

From there, a drastic change began.

We'll remove that content, report it to the Center for Missing and Exploited Children, and the new hash will join the system and benefit other businesses.

As our millions of hashes lead to millions more hashes, companies around the world will remove that content in real time, dramatically increasing the speed at which we can remove child sexual abuse content from the internet around the world.

(Applause) So it's not just about software and data, it's about scale.

If technology can overtake the perpetrators, we must call on thousands of police officers around the world, hundreds of companies to take action, and disrupt the communities around the world that today routinely abuse children.

now is the time

I can no longer say that I don't know how it will affect my children.

The first generation of abused children are now young.

Recently, the Canadian Center for Child Protection conducted a study aimed at understanding the trauma that is unique to young people trying to recover from a history of abuse that they know can never be erased.

80% of youth who were child victims have had suicidal thoughts

Over 60% have attempted suicide

Many of these young people live in fear every day, whether they're walking down the street, attending a job interview, going to school, or meeting someone online because they fear they've seen them abused.

And that fear is a reality for more than 30% of people.

I once found out that I was the one in an abuse image on the internet.

This is a difficult problem, but it's not unsolvable.

It's time to make a decision. Make a decision to face the reality that our society wants to hide. Make a decision to bring it into the open. So that the voices of child victims can be heard. Make a decision.

Participation in the TED project is part of this determination.

This is a declaration of war against humanity's worst crimes.

But what I'm sticking with is that this is actually an investment in the future, a future in which all children can remain children.

thank you

(applause)

I give lectures on Darwin all over the world, and I often talk about his strange reversal of reasoning.

This phrase came from an early critic. I like this passage. Let me introduce you.

"In the theory at hand, absolute ignorance is the creator. Therefore, the basic principle of all systems can be stated: 'To make a perfect and beautiful machine, you don't need to know how to make it.'"

On careful consideration, this proposal condenses the gist of Mr. Darwin's theory, and concisely expresses what he means, by a strange reversal of reasoning that he seems to think that utter ignorance replaces utter wisdom to achieve all the arts of creation."

It's just this, a strange reversal of reasoning.

There's an interesting page in a creationist pamphlet that reads, "Question 2: Do you know a building without a builder? 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 these, please provide details."

I see! This is a very strange reversal of Darwin's reasoning.

You'd think it would make sense that design would need a good designer.

But Darwin says otherwise

Well, today I'm going to talk about another example of Darwin's strange reversed reasoning, which is confusing at first, but equally important.

It's natural to like chocolate cake because it's sweet

Men like women like this because they're sexy

Because it's cute to dote on a baby

And jokes are fun because it's funny

These are all opposites, and Darwin shows us why.

First, the sweetness. We love sweets because we've evolved as sugar detectors. Roughly speaking, sugar is high-energy, and our brains are wired to like it.

Honey is sweet because we like it, not "We like honey because it's sweet"

Honey is not inherently sweet

If you stare at a glucose molecule, you won't understand why it's sweet.

To find out why it's sweet, you have to look inside your brain

So it's out of order to think that there was sweetness in the beginning and that we evolved to like it, but it's actually the opposite.

Sweetness was born in an evolutionary relationship

In the same way, it's not that these women are inherently sexy.

This is a good thing, otherwise there is a problem with nature's providence. How does a chimpanzee find a mate?

There may be a way to rely on delusions

there's a quicker way

You just have to wire your brain up to like this look, and that's what it seems to be.

that's all

For over 6 million years humans and chimpanzees evolved separately

The funny thing is, our body hair has degenerated.

Otherwise this would have been the sexiest

Our sweet tastes are also the result of our evolutionary instinctive preference for high-energy foods.

Not designed for chocolate cake

Chocolate cake is a supernormal stimulus

The term was coined by Nicholas Tinbergen, who did a famous experiment with seagulls. He looked at the seagull's beak and found that increasing the size of the orange spot made the chicks peck harder.

It's overstimulating, but chicks love it.

What this means is that chocolate cake is a supernormal stimulus that presses on the wiring in our brains.

There are many supernormal stimuli. First, chocolate cake.

There are many supernormal stimuli in sexy

Cuteness also has supernormal stimuli, and this is a good example.

We love babies and don't mind dirty diapers.

Babies succeed in getting our attention and being loved and nurtured.

By the way, recent research suggests that mothers prefer the smell of their babies' dirty diapers.

The way nature works

If the baby looked different and looked like this, if you had to pet this baby, you wouldn't want to hold it.

Here's a strange reversal

And finally, about the funniness, my answer is exactly the same as before.

But it's difficult and I don't really understand it, so I put the funny last.

i can't say much

It's a very difficult problem, but someone has to be able to do it, and when it's done, it's important to be rewarded for the effort.

me and my colleague finally found the answer

It's a nervous system wired as a reward for the brain to do abominable paperwork.

The catchphrase for this study is the joy of debugging.

I don't have time to go into all the details, but I can say that only some debugging will be rewarded.

I'm using humor as a neuroscience tool by turning the joke switch on and off.

It's a little bit crazy... it's not crazy now... that's how you actually learn something about the structure of the brain, about the functional structure of the brain.

Matthew Harley is the inventor of this theory, and he calls it the Harley model.

He's a computer scientist. Reginald Adams is a psychologist.

thank you very much

i am an astrophysicist

I study stellar explosions that occur all over the universe.

I have my flaws, I'm impatient and I get bored easily.

As an astrophysicist, I have the wonderful opportunity to study the entire universe, but doing it all the time feels cramped and deprived of my freedom.

But what if my restless, easily bored nature wasn't my fault?

What if you could turn that trait into an advantage?

Astrophysicists can't touch or manipulate what they're studying.

If you explode a star in a lab, you can't figure out why or how it explodes.

there are just pictures and videos of space

Everything we know about the universe, from the birth of space and time in the Big Bang, to the formation and evolution of stars and nebulae, to the structure of our solar system, has come from studying images of the sky.

Because we study the complex system of the entire universe, astrophysicists are adept at deriving simple models and solutions from vast and complex data.

What else can you do with this expertise?

What if we turned the camera around and pointed it at the ground?

The "Urban Observatory" does just that.

Astrophysicist and husband Greg Dobler started the first Urban Observatory at New York University in 2013, and I joined in 2015.

doing something like this

Take pictures of the city at night and study the lights of the city like you study the stars.

By studying the changes in brightness over time and the color of the light emitted by celestial bodies, we can understand the phenomenon of star explosions.

Observing city lights in the same way allows us to measure and predict energy needs and consumption, helping us build a stable power system that meets demand and supports growing cities.

A daytime image captures a rising column of contaminants.

In New York City, 75 percent of greenhouse gases come from buildings like this burning oil for heating.

You can also measure the degree of pollution with air sensors,

It would be impossible to put sensors in every building in New York City and collect data from a million sensors.

think about the cost

So a team of students from New York University and I built a mathematical model -- a neural network -- to detect and track smoke-like objects over New York City.

We categorize the smoke into white, harmless water vapor, which disappears quickly, and black, lingering, noxious smoke, and create a pollution map of the surrounding area for policy makers.

This interdisciplinary project yielded an innovative solution.

And the data analysis techniques used in astrophysics can be applied to all kinds of data, not just images.

We've been asked by the California District Attorney to help us figure out prosecution delays in our jurisdiction.

Some people spend years on parole or in prison awaiting trial.

The prosecutor's office wanted to know what kind of cases were being delayed, and in trying to figure it out, they had an enormous amount of data to analyze, but they didn't have the expertise or tools to do it.

that's where we come in

With the help of Angela Hawken, a professor of public policy, we first created a visual analytics tool to help district attorneys understand the prosecution process at a glance.

We also analyzed the Attorney's Office data and carefully examined the social inequalities in time taken to prosecute in our jurisdictions.

They applied the same method they use to classify thousands of star explosions to thousands of lawsuits.

And in doing so, we've built a model that other District Attorney's Offices can also use, wanting to see if there's any unfairness going on.

These collaborative studies by experts in the field and astrophysicists have yielded breakthrough solutions that have helped improve people's quality of life.

this is not a one way street

I bring my knowledge of astrophysics into urban science, and I bring the knowledge I've gained in the field of urban science back into astrophysics.

An optical echo is a phenomenon in which the light emitted when a star explodes is reflected by interstellar dust.

If you look at the image, the reflected light is white, it fades quickly, it's dynamic, it's like smoke.

I'm trying to find light echoes in images of the sky based on the model I use to find smoke in images of cities.

By exploring fascinating and intriguing things and reaching beyond my own discipline, I turned my restlessness into something worthwhile.

We all have unique perspectives that can open up new insights that lead to new, unexpected and innovative solutions.

thank you

(applause)

As fashion designers, we have the power to change culture through our decisions.

Who walks the runway, who gets advertised, and ultimately, it's up to us to decide who's celebrated, who's beautiful, and who's not.

This position comes with responsibilities

You can either alienate people or you can empower them.

Ever since I was a kid, I've been obsessed with fashion.

I enthusiastically read various fashion magazines at the local big bookstore.

To be fashionable is to be tall, thin, and have long, beautiful hair.

I thought that was the ideal, and everything I saw confirmed it.

To be honest, I still do

I stopped eating because I wanted to look like a model

It was a dark time in my life, and I was caught up in an eating disorder.

All I could think about was counting and not missing a single calorie.

It took me years to come out of my life with an eating disorder.

When I finally got out, I had a lot more room to think, and I was able to think about things I was passionate about.

For too long, the fashion industry has established an ideal of beauty as the unrealistic figure of a skinny, young, white, cisgender, non-disabled model.

You can't miss a photo of a model with pores, fat, and striae removed in Photoshop.

An example should be found soon

This definition of beauty is harmful, dangerous, destructive, and must be defeated now.

(Applause) I'm glad you agree.

(Laughter) One of the worst things I've realized over the years is that my experience with eating disorders is not uncommon.

the fact is common

In one study, 91% of women -- and this seems to apply to other genders as well -- aren't happy with their bodies.

I can't stand to live in a society where teens dislike their bodies is normal and common.

The acceptance of obesity and the autonomy of women's bodies have been argued since the '60s.

there was progress

Plus-size models like Ashley Graham and artists like Lizzo with body-affirming lyrics have gone mainstream.

oh good

(Laughter) Some brands, like Area, don't retouch in Photoshop to run ads.

Yet we are still surrounded by unrealistic expectations.

I like this quote by Lizzo, "The reason we need to affirm the body is because body denial is normal."

So how do we change the stigma of looking different or not fitting into narrow definitions of beauty?

Isn't it about celebrating beauty in all body types, being bold and bold?

Many fashion designers continue to push this narrow definition of beauty.

From school to the real world, designers sketch designs on very long, stretched, anatomically impossible bodies using just a size 7 mannequin.

Various body types are not considered at the design stage.

it is not considered

Who are you designing for?

But exclusivity in fashion goes beyond size.

It's important to celebrate the unique beauty of people who express different genders, people with different disabilities, people of different ages, people of different races and ethnicities.

In my job as a designer, I launched a brand called Chromat, #ChromatBABES, to offer women of all shapes and sizes, femmes and non-binary women, empowering and tailored clothing.

Swimsuits became a big theme, because I think swimsuits have the power to change the way you look at yourself.

I wanted to express the purpose of celebrating all body types with the unsettling garment of the bathing suit.

On our runway, voluptuous bodies, cellulite and blemishes proudly appear.

It's a fashion show, but it's also a celebration.

When I started designing 10 years ago, I didn't have the ambition to change the industry.

But the model that appeared in the show at the time happened to be a friend of mine who really wanted to be in it, and some people thought it looked very new, and unfortunately, some people thought it was still weird or new, but that's how it got its name.

But on the surface, diversity means nothing.

Equally important are the people making the decisions behind the scenes, from behind-the-scenes photographers to casting directors to interns.

Including diverse decision makers in the process is essential, and it's much better to work with people in different communities than to try to work for them.

And this is an important aspect that many young designers starting out in their careers may not think about, but plus-size models, transgender photographers, casting directors for women of color, and black makeup artists like Fatima Tomás are deeply aware of the importance of working with people of all colors, and using them is essential to creating inclusive work.

As a designer who designs a lot of swimwear, I wanted to rewrite the rules about what a body can wear in a bikini.

As babe guards, not just lifeguards, I had them crack down on violations of the rules of acceptance and tolerance of diversity at the poolside.

Instead of saying "no diving" or "no running is dangerous", why not say "cellulite welcome", "no criticism of body type" or "intolerance is forbidden", etc.

These rules were enforced by the Babeguards -- activists like Mama Cax, Denise Bideau, Gina Rocero, Erica Hart and Emme.

I've always felt that it was important to show different bodies in shows and advertisements.

Yet, until recently, we weren't able to scale up the size range significantly.

Five years ago, I launched the larger Curve collection, and I was really excited.

But as soon as it started, it fell apart.

nobody was interested

None of the department stores stocked L size or larger, and even if they did, they were placed in a completely different sales area.

In fact, the sales team said to me, "It's great to have transgender and plus-size models on the show, and I agree with you.

When buyers come to see the collections we sell, they want to buy a dream – they want to see the style they admire.”

My model was like I was told otherwise.

But I've realized that it's much more important to give this "dream" to more people.

What I want to tell consumers is that it's not your body that needs to change, it's your clothes.

(Applause) I wish there were more options for all sizes and brands.

Finally, in 2018, department store Nordstrom ordered up to 3X size.

This is a big deal for us, because the major retailers have invested in these sizes, and we've been able to order them from the factory.

This investment allowed us to rethink and change the entire design process.

We now have the tools in our studio to design for different body types.

If more fashion schools taught these skills, more designers would be able to design for different bodies.

(Applause) As fashion designers, it's our responsibility to use our position to the fullest and break down the narrow and narrow definition of beauty.

My goal is that someday teenagers won't feel the same pressure as I do.

I hope that our work will open up the fashion industry to a place that celebrates different identities.

thank you

(applause and cheers)

[This talk and its introduction are improvised.

The speaker doesn't know what's on the slide] (Moderator) The next speaker is... (Laughter) I mean... very... (Laughter) I'm an experienced linguist.

Please give me your insight. Please give me a round of applause. I'm Anthony Veneziale.

(Applause) (Laughter) (Veniceale) You think I know what's going to happen?

You may be looking at me on the round red carpet, or you may be looking at me on the screen.

There's a one-sixth of a second delay there.

can you catch yourself? I was able

I could see myself before I looked back, and this slight difference creates a gap.

(Laughter) And the gulf is exactly what happens in human language and language processing.

I, of course, work in a small research group at MIT --

(Laughter) I'm scooping up all the insights I can get.

(Laughter) This is not so often associated with computer problems, but in this case, it turns out that visual afterimages and auditory uptake have more in common than we've ever realized, and that's what this first slide shows.

(Laughter) (Applause) Your thoughts will immediately ask, "Is that a hard-boiled egg?"

(Laughter) "Does the structural strength of the egg allow it to support the weight of an object that looks like a rock?

No, it's not actually a real rock, is it? ”

We question visual information.

But for auditory information, this is what happens.

(Laughter) The floodgates of our hearts are open like the streets of Shanghai.

(Applause) There are just too many pieces of information to process, too many ideas, too many concepts, too many emotions, and too many weaknesses that we don't want to reveal.

So we hide it behind what we might call the floodgates of intimacy.

(Laughter) What is that floodgate separating?

What kind of groove is it made in?

First of all, it's this -- (Laughter) -- we found differences in six genotypes.

(Applause) And, of course, those genotypes can be classified according to their experience of neuronormative and neurological diversity.

(Laughter) And what you see on the right is the projection of neurological diversity in thought.

In general, the neurologically diverse brain can only enumerate and grasp two emotional states at once, which sometimes precludes the possibility of being emotionally involved in the current situation.

But the highly neuronormative brain, shown on the left, can handle five different emotional cognitive inputs at once.

As you can see, the variation we see at 75%, 90%, 60% is very small, and it's a dramatic difference from 25%, 40%, 35%.

(Laughter) But what are the neural circuits that help create and bridge these differences?

(Laughter) It's scary.

(Laughter) (Applause) As you know, fear is a very natural response in the amygdala, which is very closely related to vision.

The association with verbal perception is not as strong, so fear receptors may be activated prior to the cognitive use of words and verbal cues.

So caught off guard in moments of terror

It strays in a certain direction, generally in the opposite direction of intimacy.

(Laughter) Of course, there are differences between men's perceptions and women's perceptions, as well as transgender people, in-between genders, and even outside the gender spectrum.

(Laughter) But fear is the foundation of all our response systems.

The fight-or-flight response is one of the oldest reptilian environmental responses.

How can we escape from the "horns" of the amygdala?

(Laughter) I want to share a secret here.

(Applause) It just makes too much sense.

(Laughter) The secret is back-to-back. It sounds like the exact opposite of what you'd expect, but when you're in a relationship with your back to your partner and your back on their back -- (Laughter) -- it eliminates the visual stimulus.

(Laughter) (Applause) It's easier to accept failing early, and failing early means -- (Laughter) it carries a lot more weight than the effort we put into appealing to others, to our partners, to ourselves.

We spend hundreds of billions of dollars on clothes, makeup, and the latest eyeglasses, but what we don't spend money or time on is connecting with people honestly, honestly, honestly, without visual receptors.

(Applause) (Laughter) It might sound difficult.

(Laughter) But I want to be proactive about this.

I don't want to just sit on the sofa

As the historian mentioned earlier, sometimes it's important to get up and avoid the couch.

How can we do that?

"Ice" is the key

Insights Compassion Empathy I C E for short

(Applause) But when we start using this ICE method, the potential is much greater than we have.

It's actually going to be smaller than you.

At a molecular level, this insight is, and will continue to be, a common theme in all the talks I've seen at TED, as long as we continue this journey on this tiny, cliff-top planet, as you can see, death is inevitable.

(Laughter) Whether it happens to all of us at the same time is a variable we want to know.

(Laughter) If you use the ICE method, you can get a little bit more time. And if you're going to lean your back on each other, build together, put your fears aside and go for this -- (Laughter) I'll cut this part out for you in the editorial. Let's cut it in half and plant the seed that's at its core.

thank you

(applause)

Today's theme is "predictably irrational."

My interest in "irrational behavior" began a long time ago in a hospital.

I have suffered severe burns

Over the years I spent in the hospital, I saw all sorts of irrationality.

One thing that particularly bothered me in the burn ward was the way the nurses removed the bandages.

Well, now you're trying to remove the Band-Aid.

Would you rather peel it off quickly and endure a short but intense pain, or peel it off slowly and endure a longer, milder pain?

The nurses in my ward had a theory of how to remove it quickly.

Because my burns covered 70% of my body

It took an hour and I hated that horrible pain while pulling it off.

That's why I asked one time, "A little more

Take it off slowly, it takes about two hours, I can't relieve the pain."

the nurse says

We know how to treat our patients, we know how to manage their pain, and we know that the word "patient" doesn't mean "advise" or "disturb."

as far as i know

This seems to be universal

Anyway, there was nothing I could do about it, and the nurse continued in the same way.

Three years later, I left the hospital and started studying at university.

And I learned something interesting about it: I realized that by turning my questions into abstract questions and exploring the answers to those questions, I could learn a little bit about the world.

so i tried

I was still wondering how to remove the bandages from the burn patient.

I didn't have much money at first, so I bought a vise

I gathered people in the lab, put their fingers between them, and tightened them down a little bit.

(Laughter) Longer tightening, shorter tightening, more pain, less pain, and then a little pause after a while.

Every time I gave you pain How did it hurt?

If you had to choose which pain would you choose? I heard

(Laughter) It went on for a while.

(Laughter) Once I started getting research funding,

I've tried other pains, unpleasant sounds, electric shocks, even torture suits.

And these experiments showed that the nurses were wrong.

The nurses, with all their good intentions and experience, proved predictably wrong.

We don't seem to put the duration and intensity of pain on the same scale.

If the bandage had been removed from the face, which was more painful, to the leg, the pain would have gone to the less painful side, so it would probably have lessened the pain.

Also, it would have been nice to have a little break in the middle.

There was room for improvement, but the nurse didn't know.

So my question is, is this specific to nurses, or does it apply more generally?

The answer is the latter. We make a lot of mistakes.

One specific example of this irrationality is cheating.

I'm going to show you an interesting experiment that can be applied to today's chaotic stock markets.

My first interest in fraud was the Enron scandal in 2001. What the hell was going on?

Was this the behavior of a few bad people, or was it just a human error that everyone could make?

So, as usual, a simple experiment

I tried

I'm going to give you a piece of paper, 20 simple math problems that anyone can solve, but we don't have enough time.

You have five minutes to collect your answers, and you pay $1 for each correct answer.

The average number of correct answers was 4. We gave an average of 4 dollars.

Then you trick other people into cheating on purpose.

this time too

Distribute the papers, and after five minutes say, "Tear the papers.

Put it in your pocket or bag and tell me how many questions you got right."

The average number of correct answers increased to 7

This is not a few bad guys cheating a lot.

Actually, a lot of people cheated a little bit.

Now, in economic theory, fraud is an example of a simple cost-benefit analysis.

What are the odds of being caught?

How much value can be gained from fraud?

What will be the punishment if caught?

Weigh these things in. This is a simple cost-benefit analysis, and decide if it's worth the guilt.

So in the next experiment

I tried changing the amount of money to run away How much to steal

10 cents 50 cents $1 $5 $10 per question

You would think that the bigger the amount, the more fraud there would be, but that's not the case.

a lot of people stole a little bit

What are the chances of getting caught again?

Some people tear the paper in half and leave evidence

Some people tore a whole piece

One person broke it to pieces, walked out of the room, and took the $100 out of the bowl it was in.

Here, it seems that less likely to be caught means more cheating, but again, it's not.

Again, many cheated a little bit, which means they didn't respond to economic incentives.

So I tried to think about what's going on when people act in ways that don't match economic rationality.

I think there are two forces at work

One is the ability to reflect yourself in a mirror and try to suppress injustice out of self-respect.

The other is the ability to cheat a little bit and still maintain your self-esteem.

In other words, you try to get something out of small injustices that don't hurt your reputation, while keeping the line you shouldn't cross.

This is called a "private correction factor"

How can this "private correction factor" be tested?

And how can we reduce the "private correction factor"?

So I gathered people into a lab and gave them two tasks.

First, half the people were asked to recall 10 books they read in high school, and the other people were asked to recall the Ten Commandments.

The results were that none of the people who were given the "Ten Commandments" could remember all 10, but nobody cheated, even though they deliberately made it possible for them to cheat.

It's not that the most devout believers cheated less, nor that those who weren't familiar with the Ten Commandments cheated more.

The moment I tried to remember the Ten Commandments, the injustice was already gone.

Even self-professed atheists put their hands on the Bible and took an oath, and they were no longer willing to cheat.

Now, since "The Ten Commandments" is religious and unsuitable for an educational setting, I decided to use the Code of Ethics to continue my experiment.

The Code of Ethics states, "I hereby understand that this research is subject to the MIT Code of Ethics."

I had it signed and I had it torn up.

In this case, cheating is gone, but the funny thing is that MIT doesn't have a code of ethics.

(Laughter) All this happened to reduce the "private correction factor."

Then, when does the "private correction factor" increase?

First, I walked around campus and put six cans of Coke in refrigerators in various locations -- shared refrigerators for undergraduate students.

We called it "half-lived cola," and we wanted to find out how long it would last.

As you can see, it's not that long.

But instead, you could put a plate of $6 on it and put it in the same refrigerator.

Not a single piece was lost.

So this is not a good sociology experiment, so I tried to repeat the experiment I described earlier.

Now a third of the people give the paper back to us.

Another third tear up the paper and come to us and say, "Examiner, I got X questions right, give me X dollars."

The other third tear apart the paper and come to us and say, "Examiner, I got X questions right, so please give me X vouchers."

So instead of paying with money, I paid with something else.

I'll take that other thing, walk about 12 feet, and cash it.

think intuitively

Which do you feel more guilty about: stealing a pencil from work or stealing a dime?

there is a big difference between the two

What would be the difference if it was a voucher instead of cash?

In fact, fraud has doubled.

And here's what I thought was the connection between this experiment and the stock market.

Of course, it doesn't solve a big case like Enron, which has a strong social component.

In short, people are watching other people's behavior.

In fact, I check the news every day, and I witness people's injustice.

What impact do you get from it?

So I tried another experiment.

We gathered a large number of students and handed them rewards for participating in the experiment first.

Everyone gets an envelope with money in it, and at the end I tell them to return the money for the number of questions they didn't get right.

the results are not much different

When given the opportunity to cheat, people will

And a lot of people cheat just a little bit.

However, in this experiment, one fake student was mixed in.

After 30 seconds, have them stand up and say, "If I get all the answers right, what should I do?"

And the examiner tells me to go home when everything is over.

Only this

Now this fake student blends into the group

no one knows you're acting

And, of course, they're all serious cheats.

So what will the rest of the group do?

Do you want to cheat more or not?

Here is the result

Actually, the results depended on the hoodie I was wearing.

in short

We did this experiment in Pittsburgh.

There are two universities there, Carnegie Mellon University and the University of Pittsburgh.

All the participants in the experiment were students at Carnegie Mellon University.

When the acting student was a student at Carnegie Mellon, in fact he was, but he was part of a group, and cheating increased.

But when I put on the University of Pittsburgh hoodie, cheating went down.

(Laughter) This is important. Think about it. The moment the students stood up, they all realized that it was okay to cheat and leave.

So again, it's not just the chances of getting caught that matter.

This is a problem with the criteria for judging whether or not it is acceptable to be dishonest.

When people in the same group cheat and see it, they feel like they can cheat as members of the same group.

But if it's a different group, the worst people, no, there really aren't any worst people in this experiment.

So what can we learn from this?

First of all, I understand that many people cheat.

And cheat just a little bit

But as soon as you touch morality even a little bit, there's less injustice.

When you get a little further away from fraud, for example, anything other than money, cheating increases.

And when you see people cheating around you, especially if you're in the same group, cheating increases.

What if we apply this to the stock market?

What happens when you spend a lot of money on something else, which is to bend reality a little bit.

This experiment applies

Do you understand?

What happens when you step away from cash for a little while?

You have stock certificates, you have options, you have derivatives, you have land-backed securities.

If you use non-cash stuff like this, even if it's not a voucher, it's a few steps away from cash, and in the long run, people are more likely to cheat, right?

Moreover, how does this kind of observation of other people's behavior affect the social environment?

I think all of these factors are going against the stock market.

In general, behavioral economics says that

We rely heavily on our intuition, and often that intuition is wrong.

The question is whether we let go of such intuition.

Think about how we use our intuition in our daily lives, in business, especially in policy making, for example, in the education system, in creating new stock markets, in creating new policies, such as taxation and social welfare.

And the difficulty of verifying this intuition is something I know all too well when I go back to the hospital and talk to the nurses.

This is what happened when I told you what I learned about how to remove bandages.

I got two interesting answers

My favorite nurse, Etty, first said that she didn't think about nurses' feelings.

Etty said, "Of course your pain is natural.

Think about the nurses, how hard it is to remove the bandages of someone you love, and over and over again

It wasn't easy for me to continue to torment you."

But what made her suffer so much

On another, more interesting point: "I never believed that other people's intuition was correct.

I thought my intuition was right," he continued.

It's pretty hard to believe that your intuition is wrong, if you put it into yourself.

And she said that just as I thought my intuition was right, she thought her intuition was right, and it was almost impossible to have a different perspective.

But in practice this is common

We have a strong sense of intuition about everything, our ability, how the economy is going to work, how much we're going to pay our teachers.

But this intuition cannot be improved until it's tested.

How much easier my life in the hospital would have been if those nurses had questioned their intuition. If I could have examined my intuition more systematically, things might have been a little better.

thank you very much

I'm a professional troublemaker

(Laughter) My job is to critique the world, the distorted social structure, the mindless people, so I guess, as a writer, a speaker, and a shady Nigerian myself, (Laughter), this cat is what I'm aiming for.

(Laughter) People who stare at others with eyes that say, "You should do something about it."

that's me

I hope when we leave this world it will be a better world than when we were born

The way I choose to make change is to speak up publicly, to be the spark and the domino pawn.

For the dominoes to fall, the first one must fall, and then the other pieces, which have no choice, will follow.

The first pawn to fall is thinking, "I hope the next person who sees this will be inspired to become a domino."

For me, being the first domino is speaking out loud and doing the really hard stuff, especially when it's called upon, in hopes that others will follow suit.

But people like me say things that people think in their hearts but don't dare say.

I'm often seen as a fearless type,

That's not true

Speaking up against power isn't without fear of the consequences and the sacrifices you'll make.

I do it because I have to, because there are too few people in the world willing to be the first domino to fall.

It's not because I'm afraid of nothing

let's talk about fear

When I was a child, when I grew up, I definitely

decided to become a doctor

I envisioned in my heart

The toy doctor's dock is my original

(Laughter) As a freshman in college, I had to take "Introduction to Chemistry" as a pre-med course.

I got my first and last D while I was in college.

(Laughter) So I went to counseling and said, 'I'm not going to go to medical school.

So…” (laughs)

I said that I would give up on the path of medicine.

I started blogging during the same semester.

it was 2003

As one dream faded, another was beginning

It wasn't until 2010, when I lost my job in marketing, that writing, which I enjoyed as a hobby, became a full-time job.

But it wasn't until another two years later that I started calling myself a writer.

It took me nine years of writing to call myself a writer because I was afraid of what would happen if I gave up a steady salary, and I said, "What if I can't afford to buy all the shoes I love?"

(smile)

So it took me nine years to get serious about what I really wanted to do.

And I realized that fear has a unique effect, that it keeps people from doing what they want to do, and it discourages them from saying what they believe.

So I made up my mind

"Can you let fear rule your life?

I will do what I want without fear."

And then good things happened one after another, and the dominoes began to fall.

When I realized that, I said, "Okay, 2015 is turning 30, so let's make it the year of 'just do it'. Whatever scares you, let's actively pursue it."

because i'm a Capricorn

I like the feeling of my feet on the ground

But for the first time in my life, I decided to go on a solo trip abroad, to the Dominican Republic.

what did you do on your birthday

Hanging tour through the rainforest on a wire

For some reason, the clothes are business casual, it doesn't make sense

(smile)

it was already fun

Also, I hate diving in water.

After all, I want to keep my feet on the ground

So I went to Mexico and swam underwater with dolphins.

That same year, I accomplished what was my mountain. I published a book, "I'm Judging You: The Do-Better Manual."

Writing has become my profession

That year, I did the exact opposite of what I normally do -- and it really freaked me out -- that I tried skydiving.

When it's time to jump

I thought, "I made the wrong choice in life again."

(Laughter) As I fell, I saw the surface of the earth approaching, and I forgot to breathe, and in my head, I thought, "How can I jump off an airplane that didn't break down?"

(laughs) "What am I thinking?"

But when I saw the beauty of the scenery below, I said, "This is the best experience of my life."

I thought it was really good that I gave it a try.

When I have to tell the truth

It's like how you feel when you fall off that plane.

It's how I feel when I'm on the edge of an open hatch I think, "I can't do this," but in the end, I have to do it, so I do it.

Sitting in the hatch, it feels good while you're on the plane.

Every day, when I speak the truth to institutions and people who are more powerful than I am, and to powers greater than myself, I feel like I'm falling out of a plane.

But "comfort" is overrated.

Because it feels good to be silent

It feels good to continue the old way of doing things.

But comfort only leads to maintaining the status quo.

So you should feel comfortable with your discomfort by telling an inconvenient truth when you need to.

I'm -- (Applause) But I feel obligated to tell the truth. Honesty is really important to me.

Because we value honesty

justice is not arbitrary

should be required

And I think shea butter is really important. (Laughter) If our skin was more hydrated, the world would be better.

But with these values ​​at its core, it's my duty to tell the truth, and I don't have a choice.

But professional troublemakers like me shouldn't be the only ones trying to play dominoes, jumping out of planes all the time and being the first piece to fall.

People are so afraid of short-term consequences that they don't realize that they are often the second or third most powerful people in the room.

I strongly believe that the role of people like me is to shake things up in times like these.

So even if you don't have the greatest power, partnering with others will increase your power.

To support women who are unable to speak at meetings, and to make sure that the words of those who are unable to express their opinions can be conveyed.

Our role is to try to create such a space.

Everyone's happiness is a social responsibility

With that in mind, you should be able to understand that if each of us is trying to help someone else, we shouldn't have trouble when we ask for help.

Sometimes I feel like I've stumbled and fallen in the public eye. For example, when I was asked to speak at an international conference, I was told that I would have to pay for my own transportation.

I did some research and found that the white male speakers were paid to speak, they were paid for their transportation.

The white female speakers were paid for their transportation.

Black female speakers turned out to be out of pocket.

I was wondering what to do

If you expose this, you could be hurt financially.

But I thought that staying silent wouldn't help anyone.

As I was nervous about making this public, other women began to speak out, saying, "I've experienced the same pay disparity."

And at that international conference, the reality of the discriminatory compensation system began to be talked about.

The first piece of domino toppling I felt was when I read a disgusting memoir written by a famous person and used it as a joke.

I'm losing influence, so it might affect my career, but after a couple of hours of thinking, "But I gotta do it, I'm going to sit in the hatch of the plane."

I clicked "post" and escaped

(Laughter) And when we came back, there was an explosion, and everyone was happy, saying, "Finally, there's someone out there who can tell us."

And that's what sparked the conversation about mental health and self-care, and people were like, "Okay, is this okay?

I thought, maybe what I'm doing is also useful for something."

So many people started a domino effect after that, speaking out about being assaulted by an influential man.

It has inspired millions of women to say, "Me too."

Kudos to Tarana Burke for igniting the #MeToo movement!

(Applause) It's our silence that allows the establishment to keep us, the people, where we are.

Starting to knock down dominoes is, after all, about being who you are.

My shadyness hasn't changed since I was three years old.

(Laughter) This is a photo from my third birthday.

I haven't changed since then, but I feel like that's part of the domino piece. In a society where everyone is expected to act like an average human being, being who you are is also unconventional.

In a society where you can't speak loudly, I dare to raise my voice

(Applause) When I'm about to say something hard to say, I ask myself three questions.

1st question: “Do you really think so?”

Second, “Is there a reason?”

Third, "Are you saying this with love?"

If the answers are all yes, speak up and go with the flow.

this is important

When I do this self-check, the answer is always, "Yes, you should."

I don't think it's funny that thoughtful truth-telling is considered unconventional.

Unfortunately, the current situation is that speaking without fear of authority is an act of desperation.

If more people did this for everyone, the world would be a better place.

When it comes to everyone's sake, we try to tell the truth so that we can build bridges to common ground between humans. Bridges that aren't grounded in truth will crumble.

Our role -- our duty and duty -- is not to be afraid to tell the truth and to start falling dominoes, even when it's hard, or because it's hard.

thank you

(applause)

About four years ago, the New Yorker reported that a large number of dodo bones had been found on the island of Mauritius.

Mauritius is a small island in the Indian Ocean east of Madagascar, and this island is where the dodo bird was discovered and went extinct about 150 years later.

Everyone was excited about this archaeological find, because we might finally be able to reconstruct a complete dodo skeleton.

Museums around the world have dodo skeletons, but not even the Natural History Museum in Mauritius has a complete skeleton made from the bones of a single dodo.

um this isn't exactly correct

In fact, the British Museum had a complete specimen of a dodo until the 18th century, with all the skin mummified, but due to space constraints, they cut off the head and legs, and burned everything else.

On the British Museum's website, it says of the dodo, "All the rest were lost in a fire."

It's a little different from the truth, but that aside

The article starts with this photo, and I think Tina Brown, who submitted this photo to The New Yorker, is amazing.

I was fascinated by it, not just because the picture itself is beautiful. You can see the colors, the shallow depth of field, the detail.

And I thought, how wonderful it would be if I had a dodo skeleton.

(Laughter) Now, I just want to say that I've lived my life fascinated by objects and their contexts, and the dodo skeleton was one of them.

So I started looking, does anyone have a kit for sale? Is there a model I could buy?

We don't have a dodo skeleton, but we've got a clue.

I've saved hundreds of photos of dodo bones in my "Creative Projects" folder, which is a warehouse in my mind where I store whatever interests me.

Any time you connect to the Internet, there's a ton of data accumulating there, everything from pictures of beautiful rings to pictures of cockpits.

This is the key to the Bastille Prison that the Marquis de Lafayette sent to George Washington.

It's a Russian nuclear warhead launch key.The top picture is the one I found on eBay, and the bottom one is the one I made for myself.

Stormtrooper Costume My Handwritten Map of Middle-earth and Dodo Bone Folder Stormtrooper Costume My Handwritten Map of Middle-earth and Dodo Bone Folder

This folder has 17,000 photos, over 20 gigabytes of information, and it's growing every day.

And then one day, a few weeks or a year later, my kids and I went to an art supply store and bought some clay tools, and it was almost Craft Day.

I bought super sculpey, wire, and other materials.

And I saw Sculpey and thought, maybe I can make my own dodo skull.

Like I said, I'm not a sculptor, I'm a serious model maker.

I was given an illustration, I was given materials for a replica, I was given a crane, I was given a framework.

I've been doing this kind of work for about 15 years.

But if you look at things like this one -- this is my friend Mike Mernain's model for Star Wars Episode II, but that's not my area of ​​expertise.

But after looking at a ton of dodo photos, I knew the shape of the bones very well, and I thought I could make a replica, so I figured it wouldn't be that difficult.

So I decided to look for the perfect photo first.

I went through all the references and found this great photo.

Someone had this for sale on eBay, obviously a woman's hand, probably a woman's hand.

Assuming this hand is the same size as my wife's hand, I measured her thumbs to approximate the size of her skull.

And then, by enlarging this photo to actual size and comparing it to other reference photos, we calculated things like the size and length of the beak.

After hours of wrestling, I managed to create a dodo skull that I was happy with, but I had no intention of continuing at the time.

I hadn't thought about a full dodo skeleton. When I finished the skull, I realized that the wire that was used to hold the skull up was sticking out of where the spine was.

To be honest, I was also interested in the spine and other bones, and I had hundreds of references.

And I knew enough about the anatomy of the spine to make a replica.

One by one, vertebrae by vertebrae, I began to build

And at the end of the day when I completed the skull, I managed to get the spine and about halfway through the pelvis.

And again, I continued my search for references, and I didn't miss any of the little things, like illustrations and beautiful photographs.

This guy is the best! I was scanning a dodo's leg bones with a ruler.

I wanted an accurate document like this, and I duplicated every single bone and put it together.

And then, about six weeks later, I completed it, painted it, put it on a pedestal, and had a complete skeleton for myself.

You'll also see a museum-style label that tells the story of the dodo.

You can't see it in the picture, but Tap Plastics even made us a museum-style display case.

To be honest, I don't have space for it at home, but I'm afraid I have to finish what I started.

This was a big turning point for me.

Again, my life has been about chasing things and their stories, making things for myself, buying things that interest me, understanding their value, and diving deep into them.

Currently, my "Creative Projects" folder is full of ongoing projects. Things I'm already working on, things I'd like to work on someday.

But maybe there's still something in the folder that you can "sculpt" yourself, like this time. Can you tell the difference? Of course, I have my own R2D2, but to be honest, it's a lot easier for me than sculpting.

So I went through my "Creative Projects" folder and came across this thing: The Maltese Falcon.

It didn't even surprise me that I would fall in love with anything in Hammett's novels, because if you could classify people into two types, they would be Chandlers and Hammetts.

But in this case, it's not the author, the book, the film, the story that I'm obsessed with, but the movie props.

And this time, it's safe to say that the prop is the star of the story.

First of all, before the story, something like this actually existed

"Nipphausen Hawk"

This is a ceremonial jug, built around 1700 for a Swedish count, and it's also Hammett's primary inspiration for writing "The Maltese Falcon."

And in the novel, there's an imaginary bird that Hammett created.

Like the engine of a car, this bird is the driving force behind the stories in books and movies.In the film, you'll see this image.This image was created by Hammett in his novel, which was greatly influenced by Nipphausen Hawke.

Well, we've come this far, which means that first something new was created, then related props were made for filming, and the props themselves began to take on a personality that became something else entirely, a new object of ownership.

Now it's time to do some research

I actually did some research already, a few years ago, and that's why I have folders.

First, I bought a knockoff, which was pretty cheesy, but it was a Maltese falcon from eBay.

During my research, I came across this, and it's a pretty ideal document. It's a picture of an authentic lead eagle statue that was auctioned at Christie's in 1994. I immediately contacted a second-hand bookstore that said it had this catalog, and I found a really great picture.

I scanned this photo and made it life size.

I also found this: A New Jersey editor named Ala Chekmayyan found a statue of a falcon made of resin at a flea market in 1991. But it took five years to prove the authenticity of this statue, because there was a lot of debate about whether it was real.

Props made of resin were pretty much unheard of in the movie industry at the time.

It's funny how it took so long to find out if it's real. It's obvious when you look at it.

The statue was the subject of much controversy, and auction house Profiles in History sold it for about $100,000, I believe, in 1995. As you can see below, the catalog includes not only the front, but also the sides, the back, and other angles.

Now, we have all the data we need to create a replica of the Maltese Falcon.

I have no idea how a professional would start this kind of work.

So I did what I did with the Dodo at first: I scaled up the reference to actual size, cut out the negative, and used it as a template for the silhouette.

And then I'm going to make a big block out of Sculpey and project the big picture, using the negative from earlier.

And then, little by little, I shape it, feather by feather, detail by detail, patiently working on it, and it's done. I'm working in front of the TV, and Sculpey.

And thus, I was able to complete a very good falcon reproduction.

Again, I'm not a sculptor. I have no sculpting skills at all. I don't know how my friend Mike manages to make his Sculpey shiny.

So I went to my workshop, took a mold, and poured resin into it, because resin gives it a glass-like sheen.

There are many other ways to create smooth surfaces today.

One of my favorites is 70 layers of matte black car spray.

I kept spraying it for three or four days, and the paint would sag like hell, but it was a really smooth, nice surface, like glass.

Ah, after that, I polished it with fine steel wool.

Here's what made the statue to this level: There's a scene in the movie where you end up getting the statue and putting it on a table and spinning it around.

I took a screenshot of that scene and confirmed it.

Focusing on the light that hits the image, I applied the light in the same way and finished it so that it reflected exactly the same light.

Finished work on the Maltese Falcon statue here

It's a very beautiful finish, and I can assure you that by the time I finished it, there weren't that many replicas in existence in the world.

This is where things get a little weird.

Fred Saxton was a friend of George Hodale

George Hodale was a terrifying man, suspected of murdering the Black Dahlia.

On the other hand, a man named James Ellroy accuses Fred Saxton, the maker of the falcon statue, of murdering his mother.

Here's another strange story. It was in 1974, when a sequel to "The Maltese Falcon," which was a bit of a comedy, was being made. It was called "The Blackbird," and it starred George Segal. I thought it was let

Also, John's Grill, which briefly appears in "The Maltese Falcon," still exists in San Francisco today, and Elisha Cook, who played Wilmer Cook in the film, is a regular customer at John's Grill.

It was on display for about 15 years, but it was stolen in January of 2007.

The fact that it disappears many times also shows that its value increases as an object of desire to possess.

Well, I got a falcon, and it's well made, it looks great, it reflects light perfectly, and it's probably the best falcon you can get or buy.

But there's just one problem, and that problem is, I want the object exactly as it is, I want the statue exactly as it is.

My statue is made of resin, so it's pretty light.

There's a group on the internet that I'm a part of

There's a group of movie prop freaks like me, called the "Replica Prop Forum," where they trade things, make things, and exchange information about props.

There's a guy on that forum, and he's a friend of mine, but I've never actually met him.

He took my statue and did a lost wax casting and made me a bronze statue and this is the bronze statue.

And this is the finished product after etching.

I was really happy with this image

So here, everyone, here's the image.

You know how obsessive I am, this project just for me I went to eBay and bought this thing This is a Chinese newspaper published in San Francisco in 1941 I bought this to wrap this statue in.

Just like in the movies

(Laughter) yeah i know

(Laughter, applause) You can tell from the label that it weighs 12.5 kilograms.

I have a dog that weighs half as much as Huxley.

But there was also a serious problem

This is the lined up of the statues made in the hawk statue project.

From left to right it's a useless imitation I bought on eBay.

The one next to it was somehow made out of Sculpey that had been taken out of the mold.

This is what happens in the process of taking a mold and casting it: every time you take a mold and cast it in silicon, it shrinks slightly in volume and size.

This is a picture of the bronze statue and the one made with Sculpey, but the bronze statue is about 1.9 cm smaller.

Yeah really that's exactly aaaah! Why didn't you take this into account!

Why didn't I make it a little bigger in the first place!?

That's what it feels like Then what should I do? I have two choices

The first one is, I shot a laser and, well, I actually did this, and I took a 3D scan, and this is a 3D scan of a falcon.

And then I figured out how much it had shrunk to make it into a bronze, and then I scaled it up enough, made a three-dimensional master, polished it, and sent it to a foundry to get a perfectly sized bronze statue. You can swear not to touch it, just take a 3D scan, I'm happy to sign the contract, "I won't let it out of my office. I won't let anyone touch it except me. I promise."

If the other side wants it, you can write such a contract.

Then maybe that will be the end of this project.

But really, if we're honest about our own desires, we have to admit that achieving our original goals wasn't the reason we started the project in the first place.

thank you very much

I've been a political cartoonist on the world stage for 20 years.

A lot has happened in those 20 years.

Three popes appeared and witnessed a rare moment: the election of the papacy at St. Peter's Basilica, with a puff of white smoke and an official announcement.

[It's a boy! ] (Laughter) (Applause) We have four presidents of the United States.

Of course Obama was there too.

he is popular in europe

a multilateralist

love diplomacy

I also tried to be friends with Iran.

[Barack wants to be friends with you Approved/Denied] Then reality imitates caricature.

Then reality mimics the caricature, the day that Donald Trump became President of the United States.

[American democracy] (Laughter) (Applause) People often say, "When you're dealing with someone like Trump, it's easy to be a cartoonist."

There's no such thing. It's not easy to caricature people who are like caricatures.

(laughs) It's hard.

(Applause) Populists are hard to satirize, because they're better the next day when it comes to jokes.

Just imagine Trump's Christmas tweet after he was elected.

I drew this

[Merry Christmas everyone! Except for the hopeless underdogs] (Laughter) And then Trump tweeted, [Happy New Year to all of you, all my enemies, all the love to those who challenged me to a fight and lost hard] all the love to all the people who don't know what to do] (Laughter) Same!

(Applause) Now is the time for hardline leaders.

Trump's first meeting with Putin, who he personally admires, went something like this: [Give me the password so the hackers will find someone.] (Laughter) I didn't create anything.

Coming out of that first meeting, you said you agreed to work together on cybersecurity.

It's true, you remember

Who would have imagined what we've seen in the last 20 years

I saw Britain rush to the exit of the European Union.

[A hard Brexit? ] (Laughter) For a while, people in the Middle East believed that the Arab Spring would bring about a miracle of democracy.

Some dictators fell, some dictators held on.

[Assad] (Laughter) And then there's North Korea's immortal Kim dynasty.

These are people who look like they came straight out of Cartoon Network.

I was lucky enough to draw those two.

It was a very dangerous moment when my father, Kim Jong Il, died a few years ago.

[It was dangerous! ] (Laughter) Absolutely (Applause) My son Kim Jong-un has shown that he is worthy of being the heir to the throne.

I am now a friend of the President of the United States.

We meet often and have a friendly conversation.

[What kind of hair conditioner do you use? (Laughter) Should we be surprised that pathologically selfish people rule the world?

What if it was a reflection of ourselves?

take care of yourself

(Laughter) We love our phones, we love selfies, we love ourselves.

Thanks to Facebook, I have many friends all over the world.

Mark Zuckerberg is everyone's friend

[Address Book] (Laughter) He and his colleagues in Silicon Valley are the kings and emperors of our time, the kings and emperors of our time.

Pointing out that the king is naked is the work of satire.

To confront the truth with power

It's been the role of political cartoons throughout history.

In the 1830s, in post-revolutionary France under Louis-Philippe, journalists and cartoonists fought hard for press freedom.

I was imprisoned and fined, but I didn't give in.

This caricature by Daumier defined a king.

made history

It became an enduring symbol that satire triumphed over dictatorship.

Today, 200 years after Daumier's time, political cartoons are in danger of disappearing.

Look at this blank page that appeared on the front page of Cumhuriyet, a newspaper critical of the Turkish government.

This is where Musa Kart cartoons should be.

In 2018 Musa Kurt was sentenced to three years in prison.

By what?

Because he made political cartoons in Erdogan's Turkey.

Cartoonists from Venezuela, Russia and Syria are being deported.

look at this picture

it looks harmless

But it's very provocative.

When Hani Abbas came out with this, he knew it could change his life.

It was 2012, and people were demonstrating in Syria.

That little red flower, of course, is a symbol of the Syrian Revolution.

He was quickly pursued by the regime and forced to flee the country.

His friend cartoonist Akram Raslan never escaped Syria.

was tortured to death

In America, recently, famous cartoonists like Nick Anderson and Rob Rogers -- this is Rob's work -- [Grave of Truth, Morality and Rule of Law] lost their jobs for being too critical of Trump.

The same thing happened to Canadian cartoonist Michael de Adder.

maybe we should start worrying

Political cartoons were born with democracy, and it's under attack when freedom is under attack.

Kofi Annan has been working with the Cartoon Society for Peace and other initiatives for many years, and, lesser known, was the honorary president of our association, the same Nobel Peace Prize winner Annan.

was a great advocate for cartoons

The board of directors of the Cartoonists Association of America speaks out on behalf of the cartoonists who have been jailed, threatened, fired and exiled.

I've never seen anyone lose their job because of a cartoon they didn't draw.

that happened to me

I've been painting for the International Herald Tribune and the New York Times for 20 years.

Then something happened

In April 2019, a cartoon by a famous Portuguese cartoonist was first published in Lisbon's El Expresso newspaper, and then caught the eye of the editors of The New York Times and was reprinted in The New York Times International.

it caused a ripple

Condemned as anti-Semitic, it drew ire from all quarters, and the Times rushed to apologize and damage control.

A month later, my editor told me that I was quitting political cartoons altogether.

I could and should have discussed that cartoon.

Some say it's anti-Semitic propaganda at its worst.

Some people, even some Israelis, say they're just criticizing Trump for his blind obedience to the Israeli prime minister.

I have something to say about this cartoon, but that discussion didn't happen in the New York Times.

Under attack, they took the easiest route, and decided not to run any political cartoons to avoid problems in the future.

this is new

Have we invented preventative self-censorship?

This is not just a cartoon story

Is it a matter of opinion or journalism?

Ultimately it's a question of democracy.

Right now, we live in a world where morality cops on social media are taking over like a storm.

The most outraged people tend to set the tone, and the angry crowd follows suit.

This social media crowd, sometimes anointed by stakeholders, floods the editorial office in overwhelming waves.

Publishers and editors try to act quickly,

There is no room for meaningful discussion

Twitter is not a place for discussion, it's a place to vent your anger.

bring it there

Someone has done a very good job of portraying the human condition in these tumultuous times.

who do you think it is?

Shakespeare 400 years ago

[Life is a story told by fools, full of noise and anger, meaningless] Shakespeare still applies today, doesn't it?

But the world has changed a bit [too long! ]

(laughs) really

(Applause) Social media is both a blessing and a curse for comics.

It's an age of images, where images are shared and spread, but they're also targeted.

It's often the case that what cartoons really target is the media that publishes them.

"Iraq coverage?" "No, it's Trump." Traditional media's relationship with social media is a funny one.

On the one hand, there's the time-consuming process of reviewing and curating information.

On the other side, there's a sort of buffet for rumors, opinions and emotions, amplified by algorithms.

Even high-end newspapers mimic how social networks work on their websites.

Emphasis on "10 most read" or "10 most shared"

I should recommend "the 10 most important things"

(Applause) The media shouldn't be intimidated by social media, and editors should stop being afraid of angry crowds.

(Applause) Shouldn't the warning be like a cigarette pack?

[Satire may offend you] (Laughter) No way.

[Maybe you're hiding a sexy bomb under your burkini] Political cartoons are meant to provoke discussion as well as opinion.

Above all, it encourages us to think

offended?

leave it alone

I do not like it?

don't look

It is not dialogue or listening to each other that freedom of expression is at odds with.

I am intolerant

(Applause) Let's stop self-censoring in the name of political correctness.

You have to get up and push back, or you'll wake up tomorrow in a detoxified world where satire and political cartoons are impossible.

Because when political pressure and political correctness go hand in hand, free speech is stifled.

(Applause) Remember what happened in January 2015?

Journalists and cartoonists at the Charlie Hebdo newspaper in Paris were massacred, murder as censorship in its most extreme form.

remember how it felt

[I can't live without humor.] No matter what you thought of that satirical paper and that cartoon, we all felt that something very fundamental was at stake: citizens of a free society -- indeed, citizens of any society -- need humor like air.

That's why extremists, dictators, tyrants, and ideologues of all kinds don't tolerate humor.

We live in a crazy world right now, and we need political cartoons more than ever.

and need humor

thank you

(applause)

"A few tens of hours can change a life, and when it does, those tens of hours must be salvaged from devastation and scrutinized, like parts salvaged from a charred watch." This is the world of Arundhati Roy's 1997 book, The God of Little Things.

Set in the town of Aemenam in the Indian state of Kerala, the story revolves around twin sisters Rahel and Esta. They were separated for 23 years after dozens of hours that changed their destinies.In those hours, their cousin drowned, their mother's illicit love was revealed, and her mother's lover was killed.

Although this book begins with the reunion of Rachel and Esther, the story is mostly in the past, and it reconstructs in detail the tragic events that led to their separation.

Because of his rich language and skillful storytelling, Roy won the prestigious Booker Prize for "The God of Little Things."

In this novel, she questions the culture, social conventions and colonial history of her native India.

One of the focal points is the caste system, a system that classifies people according to their social class, which has been around for thousands of years.

By the mid-20th century, the four original castes associated with specific occupations had split into 3,000 subcastes.

Although the caste system was constitutionally abolished in 1950, it continued to shape social life in India, routinely marginalizing people from lower castes.

In the novel, Rahel and Esta are close friends with Veruta, who works in a family pickle factory and comes from a caste known as the "untouchables."

When Veruta falls in love with the mother of his twins, Amu, the two violate what Roy calls the "law of love," which is forbidden between castes.

Roy says their tragic relationship "will live forever in everyday objects," such as "coat racks," "tar on the road," and "moments of speechlessness."

The story opens at the funeral of her half-British cousin Sophie, who drowned.

As families mourn, in the hot church, lilies dry and curl.

A bat child climbs a mourning saree

Tears roll down my cheeks like raindrops dripping from the roof

By retelling the past, the novel explores the political turmoil of India as well as characters struggling to survive in a world they don't quite fit in.

Amu, divorced and scorned and shunned by his neighbors, feels deeply trapped in his small town home and suffers from the urge to harass his beloved child.

Veruta, on the other hand, reconciled his relationship with Amu and his friendship with his twins, his employment relationship with this family, and his participation in the emerging communist forces in opposition to Indira Gandhi's Green Revolution, which in the 1960s defied its name by introducing chemical fertilizers and pesticides and building dams on Indian rivers.

While these policies have increased harvests and prevented starvation, they have also resulted in the displacement of lower caste people and the spread of environmental pollution.

When the twins return to Aemenam as adults, the scars of the Green Revolution can be seen everywhere.

The river, teeming with life as a child, greets the twins with "a terrifying grin of skeletons."

In the world of "God of the Little Things," "Various despairs compete for supremacy, but individual despair cannot be hopeless enough.

Personal turmoil is left on the sidelines of great, violent, endless, violent, ridiculous, insane and impracticable national turmoil."

American baseball player and philosopher Yogi Berra said, "If you don't know where you're going, you probably won't get there."

Our pool of scientific knowledge gives us better perspective and a clearer understanding of how climate change will affect our future and our health.

I'm going to talk to you today about how the greenhouse gases emitted by burning fossil fuels are making our food less nutritious.

Let's start by talking about the food pyramid.

We all know the food pyramid.

Everyone needs a balanced diet

We need protein, micronutrients, vitamins.

So let's take this and think about how we can ensure that we always have the food we need to grow and develop.

But for us, eating is not only a necessity, it's also a pleasure.

There are many foods that are essential to food culture, such as bread, pasta, and pizza.

we enjoy eating them

Food is important to our diet, but it is equally important to our food culture.

Carbon dioxide (CO2) concentrations have risen from 280 ppm at the dawn of the industrial revolution to 410 ppm today and continue to rise.

This CO2 contains the carbon that plants need to grow.

Plants take in CO2, break it down, take out carbon, and use that carbon to grow.

plants also need nutrients from the soil

So CO2 is a nutrient source for plants.

This is good news about rising CO2 levels, which will help stabilize food supplies around the world and ensure that people have enough food to eat every day.

Approximately 820 million people around the world suffer from food shortages on a daily basis.

So there's a lot of literature out there that says rising CO2 levels are a solution to the food security problem.

We must accelerate progress in agricultural productivity to feed a projected population of 9 to 10 billion people in 2050, and achieve the United Nations Sustainable Development Goals, especially Goal 2, which is to reduce food insecurity, increase nutrition, improve access to food and reach it for all.

We understand the impact of climate change on agricultural productivity

The temperature of the earth has risen by about 1 degree since pre-industrial times.

This is causing changes in temperature and precipitation patterns across the globe, with different impacts on agricultural productivity in many parts of the world.

It's not just changing temperatures and precipitation levels across the country, it's also causing extreme weather events.

Extreme weather events such as heat waves, floods and droughts have a noticeable impact on productivity.

And CO2 doesn't just help plants grow, it has many other consequences. Higher concentrations of CO2 lead to increased synthesis of carbohydrates, sugars and starches, and decreased protein and other important nutrients.

This is very important when thinking about future food security.

Two nights ago, when we were chatting about climate change, someone said, "I'm a five-sevenths optimist." What that means is that you're optimistic five days a week and worried about climate change the other two days.

If you think about micronutrients, almost all of them are affected by rising CO2 levels.

Two of the most prominent are iron and zinc.

A lack of iron can lead to iron deficiency anemia

Its symptoms range from fatigue and shortness of breath to something quite serious.

Lack of zinc reduces appetite

This is a serious global problem

Nearly 1 billion people are zinc deficient.

Zinc is very important for maternal and child health.

affect development

B vitamins are essential for many reasons.

Helps convert food into energy

It's important for the functioning of many physiological processes in our bodies.

Now, the higher the carbon concentration in the plant, the less nitrogen, and the less B vitamins.

The problem extends beyond humans

Cattle farming is already being affected, because pasture quality is declining.

On the contrary, the effects extend to all organisms that consume plants.

Consider, for example, pet cats and dogs.

If you look at the food labels on pet foods and dog foods, most of them contain significant amounts of grain.

So it affects everyone.

So why is this a problem?

Field studies and laboratory experiments revealed the problem.

In terms of field studies, focusing mainly on wheat and rice, let's say you have a rice paddy, which is divided into several plots.

Each plot has the same conditions, the same soil conditions, the same rainfall conditions.

What's different is that we're spraying some of the compartments with CO2.

That way, we can compare the differences between now and later in the century under different CO2 concentrations.

There aren't many studies like this, but I was involved in one.

We observed 18 rice varieties in China and Japan, and we cultivated them under the conditions we expect to see in the second half of this century.

Looking at the results, white is the current conditions, red is the conditions in the second half of this century.

About 10 percent less protein, about 8 percent less iron, and about 5 percent less zinc.

It may not seem like a big change, but when you think about the poor in every country who eat starchy foods, this change will push the undernourishment of the most vulnerable to extremes and cause all kinds of ill health.

For B vitamins, things are even more serious.

About 17% reduction when looking at vitamin B1 and vitamin B2

Pantothenic acid Vitamin B5 decreased by about 13%

Folic acid is reduced by about 30%

These numbers are averages from various experiments.

Folic acid is essential for fetal development

If a pregnant woman doesn't get enough folic acid, the risk of having a baby with a birth defect is much higher.

So if CO2 levels continue to rise, it can have serious consequences for our health.

As another example, Chris Wayant and his colleagues modeled the pathways from elevated CO2 levels to declining levels of iron and zinc, but only iron and zinc, but also their various effects on health.

We looked at malaria, diarrheal disease, pneumonia, iron deficiency anemia, and we looked at different outcomes that could be predicted in 2050.

The darker the color, the greater the impact.

You can see that the impact is greater in Asia and Africa, but we also see people in the United States and European countries affected as well.

estimated to affect approximately 125 million people

We also did a modeling study of the most effective interventions, and the conclusion was that greenhouse gas emissions were reduced. If we cut our greenhouse gas emissions by the middle of this century, we should be less concerned about the possible consequences of the second half of this century.

These experimental and modeling studies don't take into account climate change per se.

Focuses only on CO2 content

Combined, these two factors are expected to have a far greater impact than what I've been telling you here.

I really wish I could tell you here, what you ate for breakfast, and what you're going to eat for lunch, has changed in terms of nutritional value compared to when your grandparents did.

unfortunately i can't

it hasn't been researched

And how is the current food insecurity affected by this change?

I can't talk to you even if I want to

this too has not been studied

There's a lot to know about this area, including what the solutions are.

We don't know exactly what the solution is, but there are many possible options.

technology is making progress

It's a technology of plant breeding and nutrient fortification.

It is also possible to improve the quality of the soil

Of course, it would be very useful to know how these changes might affect our future health, our children's health, our grandchildren's health.

These investments take time

It will take time to solve all the problems

No research funding from government bodies or private industry bodies.

Investment is essential to determine the path we take in the future.

In the meantime, what we can do is ensure that people in all parts of the world, not just the richest regions, have access to nutritious food.

It's also about reducing greenhouse gas emissions through individual and collective efforts to mitigate the potential problems of the second half of this century.

They say, "Be ignorant if you think education is expensive."

let's avoid that

Invest in us, our children and the planet.

thank you

(applause)

what am i doing here

I was born in the Scots-Presbyterian ghetto in Canada, I dropped out of high school, I don't have a cell phone, I paint on paper in gouache, and gouache hasn't changed in 600 years.

About three years ago, I had an exhibition in New York called "Serious Nonsense."

I'll be the first here, so I'll start.

I called it "serious nonsense," because the serious side of it uses the exacting realism technique that's been used in magazine illustrations since I was a kid.

On the other hand, as you can see, we also incorporate nonsense.

This is a Scottish castle playing indoor golf.

This is part of a series called "Zany Afternoons," which has been turned into a book.

This is a homemade rocket-propelled car, a 1953 Henry J model, with an obsession with precision -- in a quiet residential area of ​​Toledo.

Donated to the Los Angeles Film Museum

As you can see, I'm from the same city as Frank Gehry.

My work is so personal and so quirky that I've coined my own terminology.

A lot of my work falls into what I call "nostalgic futurism," which is about looking at the future from the perspective of the past.

It's always somehow pleasantly wrong

Its heyday was in the 1930s, because the Great Depression was so bleak that anything that escapes into the future --

Because science has inspired us

This is "Popular Workbench", the science and entertainment magazine of the time. I've collected many issues from the 1930s onwards. It was all improvisational, from living in poverty to making sunglasses from wire hangers.

Automotive retrofuturism is one of my specialties.

I also drew car illustrations and was a copywriter for automotive advertising, so I have a lot to say on the subject.

Detroit has always been half a step into the future when it comes to advertising.

This is a '58 Bruggemobile, so new it seems like it was yesterday

On the side of the road men are staring at cars

This is from a catalog that's about 18 pages long, and it's from when I was drawing for my first work, "Lampoon."

"Technological archaeology" is an attempt to unearth miracles of the past that, for good reasons, never happened.

The airship Zeppelin was in the Zeppelin catalog and is based on the Hindenburg.

The zeppelin airship was the largest man-made flying object.

It holds 56 people, flies as high as you can hear a barking dog, and at the speed of a Buick, and it costs twice as much as a first-class cabin on the Normandy.

So like the Hindenburg, it disappeared.

This is an autogyro duel in Malibu in the '30s.

The autogyro predated the invention of the helicopter, but it was premature and not very successful.

It's also the only technology born in Spain in the 20th century.

you should know

Flying cars never took off and ended up as a post-war dream.

My father used to say, "Someday cars will fly."

This is the future as seen from 1946, where every American home has a flying car.

"That's Moscow Shirley I hope you can speak Esperanto!"

"Artificial nostalgia" is my pronoun, a theme I use often.

It's a sentimental yearning for a time that never existed.

Some people say that nostalgia is the most useless of human emotions, so you can be seriously playful.

This symbolizes "artificial nostalgia," lunch on the wing, memories of dining on the wing of an airplane on a sunny summer day in France in the 1920s—not very visible here, but Hemingway being flown downstream while reading his new novel to Fitzgerald and Ford Madox Ford.

This is a tank polo match in Southampton.

There's nothing more fun than making fun of stupid rich people.

And accuracy is the cornerstone of my serious nonsense.

This has a big impact

For example, this is a 1916 British Mark IV tank.

It has two machine guns, a cannon, and a 90 horsepower Ricardo engine.

It's 8km/h and it's 40 degrees hot and pitch black inside.

Inside was a birdcage with a canary to see if the Germans were using poison gas.

It's kind of funny, isn't it?

This is Manhattan's Motor Ritz Tower in the '30s, and if you're brave enough, you can drive up to your front door.

It seems that the big guys had apartments here.

I also included the Zeppelin, which I especially love, and the luxury liner.

I like cigars too There will be ads for cigars

Artificial nostalgia also deals with serious subjects like war.

This is the great Battle of Britain in 1940. A Messerschmitt ME109 flew into the Houses of Commons, flying around, angering Churchill somewhere in this picture.

this is good old memory

"Excessive exaggeration" is simply a way of maximizing exaggeration for the sake of fun. This is another piece of art I did -- another catalog -- the RMS Tyranic, the world's largest passenger liner.

It goes on for several pages, so I can't see it, but it says, "Passengers in third-class cabins can't get to their cabins until the end of the voyage, and they're safe enough that they don't need insurance."

Titanic is clearly a model

But it's not a heart cry about human arrogance in the face of matter.

It's just a silly joke in bad taste.

I think you'll be surprised at the "super cheapness"

It doesn't really matter. DeSoto just discovered the Mississippi River.

It was a quick one for the back cover -- I only had about four hours to work on the back cover of "Lampoon," and I said, "It's embarrassing--

I thought that no one should see it, but it seems that there was an inquiry about the reprint version.

'Urban absurdism' - The New Yorker likes it

I drew the cover to make life in New York look weirder than it actually is.

Of the 40 covers, 30 are drawn with the concept of urban absurdism.

One night, at 3:00 a.m., I was driving down 7th Avenue, and the streets were filled with smoke.

It's the Temple of Dender in the Metropolitan Museum of Art, but it's not very impressive.

I thought it would be nice to decorate it a bit and make it flashy.

This is a pretty biased cover, it's not New York.

I received a rude email from an environmental group that said, "This is too much of a joke. You should be ashamed of yourself. Please apologize on our site."

I didn't have time for that, but maybe I'll apologize later

This is a picture of my language center.

(Laughter) I like the term "Eurotrash."

(Laughter) Europeans are going through customs at JFK airport.

This is the New York Bike Courier on its way to the Tour de France.

If you live in New York, you know how bike delivery works.

But they didn't know that they were delivering the blueprints and all that stuff in a cylindrical case, and a lot of people thought the courier was a terrorist -- they thought it was the scene where they're launching rockets into the Tour de France.

This is the only fashion cover

It's a picture of a little old woman living in a shoe, and it's called "There Goes the Neighborhood."

I don't know much about fashion, but they told me to be mindful of Mary Jane. At this time, the art director and the editor had a disagreement, and there was a dispute over whether or not to draw the shoe straps.

This is a light-hearted joke about the expressway toll booth "E-ZPass" with the letter "R".

this is more of a prank

This is a picture of the audition for "King Kong".

(Laughter) People often ask me where my ideas come from.

The truth is, on nights when I've had too much red wine, ideas come to me like copycats, and I just write them down.

Very complete, no need to rethink

When I was trying to put an idea into action, an old lady named Rosenberg said, "This cover looks really nice."

Her formerly known name was Faye Lei, and I couldn't say, "I'll give it to you."

Finally, this is the first 3-page cover I've ever drawn. I don't want to draw it anymore.

I used an escalator to represent human evolution in three parts.

Unfortunately, you can't see it all at once, but I think you can see the evolution of human movement.

(Applause) It's great, I was able to show you all the work without the distraction of jokes.

And here's one sleazy hype: we're releasing a children's book called Marvel Sandwiches in the fall, and here's an excerpt from the serious play so far.

Thank you for your attention

From now on, I would like to present three projects in a hurry.

i don't have that much time

And in that rushed presentation, I want to emphasize three ideas.

First, I like to call this a hyper-rational process.

This process elevates rationality to tremendous levels, transcending all conventional conventions commonly referred to as rational conclusions to something.

And it ends up like the one I'm going to show you here. In fact, you wouldn't expect that to be the result of rationality.

The second thing is -- the second thing is that this process has no signature.

It means that there is no original author

Architects are desperate to become original authors

It's editorial, it's a team thing, and the reality is that in this process, we no longer see the traditional chief architect drafting the blueprints and his subordinates executing them.

And the third, which is very difficult to justify and generalize in this time, is to challenge the notion of high-modernist flexibility.

High modernists said that they create spaces that are common and unique, in which almost anything can happen.

I call it "shotgun flexibility." You can turn your face away and shoot, and you'll always end something.

The promise of high modernism is that practically any activity can take place in a space.

But as we see it, operating expenses dwarf capital costs in terms of design parameters.

So under this kind of thinking, on opening day, everything that's actually in the building, or whatever seems to be an immediate need, dwarfs the possibilities of what could happen thereafter, and what it encompasses.

So we're proposing a different kind of flexibility, which we call "compartmentalized flexibility."

The idea is to define a series of points in a continuum and design specifically towards them.

They might be a little bit off-center, but in the end, you actually get about as much functional breadth as you originally wanted.

High modernist flexibility doesn't work

And then we're going to put together the Seattle Central Library, and what you're going to see right in front of you, with five or six diagrams, is the design process itself.

Together with library staff and board members, we came up with two central observations.

This is the first one, and this shows the evolution of writing and other technologies over the last 900 years.

This diagram kind of shows our view of books. Our view is that books are technology -- people forget that -- but books are a technology that will have to share dominance with other really powerful technologies and media.

The second premise is that I had a really hard time convincing the librarians in the beginning that since the Carnegie Library, it's been a tradition in America that libraries have another responsibility, which is their social role.

Now, I'll come back to that later, but actually the librarian said at first, "That's not our role.

What we have to do is with the media, especially with the books."

What you're seeing now is the design of the actual building.

The diagram above is what we've seen in many modern libraries, using high-modernist flexibility.

It's like anything can happen anywhere.

We don't know what the future holds for libraries, we don't know what the future holds for books, so we use this approach.

Not only were all the buildings we've seen featureless, and what's worse, the reading room looked like a copy room and it looked like a magazine corner, but all the problems that plagued the library at the time began to swallow up other things that were happening in the library.

And in this case, the proliferation of books has swallowed social responsibility.

So we proposed as shown below

It's a brainless approach, it's simply partitioning.

And we put the things that we think are likely to progress in there -- it doesn't mean that we can predict what will actually happen in the future.

that was the central idea

And now I had to convince the libraries to accept that the social role is just as important for the media.

What you see on the left is their program.

given to us as clear and glorious

Our first task was to digest it and show it to them and say, look, we haven't changed the content.

Two-thirds already -- in the lower white strip -- which you said is not important -- is allocated to social functions.

So when we showed it, they agreed that maybe we could go with these core concepts.

We got it right by going back to our original principles, and that's the third table.

we reassembled everything

and we started making new decisions

What you see on the right is the design of the library, especially in terms of floor space.

Here, in the table on the left, as you can see, there are five platforms -- collective programs like combs.

There are more undefined spaces on the right, such as reading rooms, and I don't know how they'll change in 20, 30, 40 years.

that was exactly the design of the building

They signed the contract, and unfortunately for them, we came back a week later and presented this to them.

As you can see, it's right there on the right.

(Laughter) We just scaled -- no, literally.

The thing on the left side of the table is a box

I sorted them into five parts, which was super efficient.

we had a very limited budget

Pushing them around in the field, creating a very literal contextual relationship.

The water should be visible from the reading room

There should be a public plaza in front of the main entrance, for purposes such as adhering to zoning codes.

There are five platforms - they are boxes -

There's something really different going on inside each one.

The areas in between are like a continuum of cities, and it's impossible to predict whether they'll evolve to the same degree.

So let me give you a little taste of the power of this idea, and the biggest block is what we call the book spiral.

It was made in a really cheap way - a parking lot for books.

It happens to be between the sixth and tenth floors of a building, but that's not necessarily an expensive approach.

No matter how much the bookshelves grow or shrink in the building, they are arranged in Dewey's Decimal Classification order, and if the order is clearly maintained, there is no maze of afflictions that we often experience in public libraries.

(Laughter) And here's the final touch: I gave the whole thing a hull, because in some places it was out of balance.

The exterior does two things, it's an economical design.

For one thing, it's a structural element that stabilizes the entire building laterally.

But its size wasn't just designed for structure, it was also designed to hold all the glass.

At the time, the glass, as we use the term "embedded," had a layer of metal embedded in it called "stretched wire mesh."

It acts like a little shutter window, so when you look at the building from the outside, it looks totally opaque, but when you look at it from the inside, it's totally transparent.

Now let me show you around the building.

can i find

Apologies to those who get motion sickness

Now this is the building

What I think is important is that when we first opened the building to the public, the public saw it as a complete whim and ego on our part.

Believe it or not, the librarians came to our defense.

They said, "I don't know what it is, but I know it has everything I need. I've been doing this program all my life, so I know."

Enter one of the entrances

It's an unusual building for a public library, obviously.

You enter what we call the living room—

This is actually a program that we invented together with the library.

I recognized that public libraries were the last remaining free public places.

There are many shopping malls in downtown Seattle where you can take shelter from the rain, but there aren't many free places to take shelter from the rain.

It was an open-ended place where you could really do anything: eat, shout, play chess.

Now let's move on to what we call the mixing chamber.

It was like the main technology department of the building.

please let me know if i am too early

go up

This is actually the place I built into the building to propose to my wife, here.

(Laughter) By the way, her answer was yes.

(Laughter) I'm running out of time, so I'd like to end this.

I can show you this later

But let's hurry up and get into the Book Spiral because, as I said earlier, I think it's the most -- this is the main reading room -- the most unique place in the building.

Still feeling dizzy?

Now this is the book spiral

It's very confusing, but it's actually a series of stair steps.

This allows you to go up one floor in one block, so it's a continuum.

Let me come back and talk about my second project.

I will talk about this very briefly.

this is the dallas theater

He was a strange customer for us, because he came to us and said, "I want you to build a new building for us.

We've been working in a temporary space for 30 years, but that temporary space has turned us into an infamous theater company.

Theater is really concentrated in New York, Chicago and Seattle, except for the Dallas Theater Company."

The fact that we were performing on a temporary stage meant that if we were doing Beckett, we could have chosen a stage with no walls, and if we were doing "The Cherry Orchard," we could have made a stage with a hole in the floor.

So it was a daunting task to create a brand new building, one that could retain this experimental character even when it was fresh.

And second, the theater company was what we call a multiform theater, and they had a repertoire of different kinds of performances.

In the morning, we'll do something in an arena format, and then we'll do something in a proscenium format, etc.

So we had to transform quickly into a variety of theater formats, and because of operational costs, this was practically no longer possible in almost any multiform theater in America, so we had to figure out how to accomplish that task.

So what we were thinking about was literally flipping the theater upside down. We built a frontstage and a backstage, which are the front and back of the theater.

I spent money on the theater's operations machinery.

It's like a theater building that you can put anywhere, and if you move the operation part, wherever you put it, the space underneath will instantly transform into a theater.

So we can go back to the original purpose and redefine the upper stage mechanics, the sound system, the lighting system, etc.

And with the push of a button, the artistic director can change between proscenium format, thrust format, arena format, traverse format, flat-floor format, very quick transformations.

In fact, we were able to use our operating expenses -- excuse me, by investing capital -- to achieve things that we could not actually achieve in our operations.

The idea is that the artistic director now has a palette from which to choose from a series of shapes and processions, and the theater fixtures, which normally have to be placed at the front or the back, can now be placed at will.

The artistic director could show the performance entering the Wagnerian march in Act 1 Thrust format, the intermission in Greek marching and Act 2 in Arena format.

I'll show you what this really means

Here's a closer look at the theater

Any part around the theater can be wide open.

The lighting equipment is lifted, separate from the sound equipment.

It can also be partially opened, so you can actually drive the motorbike directly onto the stage, you can perform in an open space, and you can open it up during breaks.

Balconies can also be moved between these arrangements and put away.

Eliminates stage openings

So you can bring in huge objects, so in fact -- the first play at the Dallas Theater Company is going to be a Charles Lindbergh play, and you're going to want to bring in a real airplane.

And in the off-season, you can actually rent out the space for a completely different purpose.

this is a distant view

All parts open for various events

and night view

Again, we cleaned up the lighting system and left the sound system in place.

The left side is Monster Truck Show

I would like to show you my last project

Another strange customer

I turned all my ideas about development upside down.

He came to us and said - unlike your average developer - "We want to start by providing Louisville with a museum of contemporary art.

That's the main goal."

Instead of being developers looking for money-making opportunities, they thought they could inspire people downtown.

The fact that we want to support contemporary art museums has created a vision for the future in the first place, and then in the opposite direction.

The shape of the future has led to very large mixed-use buildings, to support their artistic aspirations, but also to open up opportunities for art itself, to collaborate and engage with commercial spaces, and in fact more artists want to work in them.

It also made us think about how to create a building that is both a building and a subordinate building that can be trusted.

This is the outline of the city of Louisville, and I'm going to talk about the various constraints that led to the project.

The first is a physical constraint.

We actually had to work in three locations, all of which were much, much smaller than this building.

We had to work next to the new Muhammad Ali Center and respect that.

had to work in flood plains

This area floods three or four times a year, and there's a levee behind the land, similar to the one that broke in New Orleans.

I had to work behind Interstate 64, and I was driving in the middle of the land off the road.

It's kind of like, we were starting to create a constraint nightmare in the swamp, so to speak.

Underneath the swamp are the city's main power lines.

And then they wanted to add a pedestrian walkway, which connects a series of cultural sites, and a view walkway -- it's a historic district, so they didn't want to get in the way with the new building.

(Laughter) And we're about to add a million square meters.

If we do the traditional thing, that million square meters -- these are different programs -- traditionally is to identify public objects and put them on site, and that's really bad because the public objects were in the middle of a flooded swamp.

And then we scaled all the other elements -- different commercial elements -- hotels, luxury homes, offices -- and stacked them on top.

and made the infeasible

Actually - as you can see - this is the Time Warner Center.

(Laughter) Our strategy was very simple.

You just lift the whole block up and flip some elements around and move them around so that they have the right view and relationship to downtown, and then create a circular connection and reposition the road.

That's the basic concept, let me show you how it goes.

It's a very formal and intentional act, but it comes entirely from constraints.

There was a bit of a nervous reaction when I showed it to the public, because it's an architect making a statement, not an architect trying to solve a set of problems.

Now, in that central region, as I said, you can mix a series of things.

Now these towers -- like this X-ray -- were completely developer driven.

They told us about shapes, sizes, and so on, and we focused on all the public elements -- lobbies, bars, all the different commercial elements that would have -- and put them together in the middle, like a subway map, in the transit area, which also has a modern art museum.

And it creates a situation like this, where artists can work in an art space on the 22nd floor that has a great view, but also a familiarity that the curator can open and close.

So you can see people on exercise bikes, you can see art.

If an artist wants to use something like a pool, they can start exhibiting in a pool, not necessarily within the confines of a modern gallery space.

how to make this

It's very simple. It's a chair.

Start by making the center

While you're building the center, you're building a contemporary museum on the same plane.

It's been incredibly efficient and cost effective.

This is not a high budget building

When the center reaches mid-height, complete the museum, put the machinery in it, and hoist it into the air.

Here's how to build a huge airplane hangar, for example the hangar for the Airbus A380.

Build the center, finish the meat, and you can have something like this.

Now, we only have about 30 seconds, so let's start the animation and finish with it.

thank you

(Applause) Chris asked me to add that the theater is not yet finished, and this project will begin construction in a year and will be completed in 2010.

[find public elements] [add public elements on the same plane] [optimize tower size] [place tower on site] [hoist] [crook] [optimize surrounding buildings] [adjust with surroundings] [manage 7th street]

About 17 years ago I started getting allergic to the air in Delhi

Doctors advised me that my lung capacity had dropped to 70% and that it could be life-threatening.

From what I've learned at the Illinois Institute of Technology, the Indian Institute of Energy and Resources, and NASA, I've learned that having three common houseplants indoors can provide the fresh outside air we need for our health.

We also found that it was possible to bring proper outside air into the room while maintaining industry standards for indoor air.

The three plants are areca sansevieria and gentian

As you can see the scientific name

Areca extract removes carbon dioxide and replaces it with oxygen.

Each person needs four shoulder-high plants. As for maintenance, in Delhi you have to wipe the leaves every day, but in areas with clean air, once a week is fine.

The betel nut must be grown in a lean fertilizer called bemi or hydroponically, and must be taken out every three or four months.

The second plant is the sansevieria, which is also a common houseplant, and is also called a "bedroom plant" because it converts carbon dioxide into oxygen at night.

Each person will need 6 to 8 waist-high plants.

The third plant is Lagoon purpurea. This is also a plant that can be found anywhere.

Lagoose extract removes highly volatile substances such as formaldehyde.

These three plants provide us with all the fresh air we need.

Even if you were to be put in a bottle with a closed lid, with these three plants, you wouldn't die, because you wouldn't need to bring in the outside air.

We grew three plants in our 50,000-square-foot (4,600-square-meter) 20-year-old building in Delhi.

Prepared about 1200 plants for 300 residents

What this study found was that if a person was in this building for 10 hours, there was a 42% chance that the amount of oxygen in their blood would increase by 1%.

The Indian government has announced that this building is the healthiest building in New Delhi.

And when compared to other buildings, there was a 52 percent reduction in eye irritation cases, a 34 percent reduction in respiratory problems, a 24 percent reduction in headaches, a 12 percent reduction in pulmonary dysfunction and a 9 percent reduction in asthma.

The results of this study were published on September 8, 2008 and are available on the Indian government's website.

Our research also found that using these plants increased human productivity by as much as 20%.

Even more amazing, it was found to reduce the amount of heat required to maintain the building by 15%. This is because the supply of outside air is less.

Right now, we're testing this experiment on a 1.75 million square foot building, and we're planning to have 60,000 plants inside.

Why is this important?

And it's also important for the environment, because the world's energy needs are projected to grow by 30 percent over the next decade.

Currently, 40% of the world's energy is used to maintain buildings, and it is estimated that 60% of the world's population will live in buildings in cities with a population of over 1 million in the next 15 years.

And more and more people will look to air-conditioned places for their livelihoods.

To change the world, change yourself first Mahatma Gandhi

thank you

(applause)

Imagine a future in which no one dies. Rather than physical immortality, our minds are uploaded into the digital world.

The mind can use the avatar's body to live in a realistic simulation world, and even participate in and contribute to a living world.

Uploading minds is a powerful fascination, but how do we actually scan people's brains and upload their minds?

The biggest challenge is whether we can scan the brain in enough detail to capture the mind and reproduce that detail artificially perfectly.

Before that, we need to know what to scan.

The human brain has 86 billion neurons, connected by at least trillions of synapses.

The pattern of connections between neurons in the brain, every neuron and every connection to each other, is called the connectome.

The map of the connectome hasn't been mapped yet, but there are still many factors involved in neural signaling.

There are hundreds or thousands of different kinds of connections -- synapses.

Each has a slightly different function

Some are fast and some are slow

Some grow or shrink quickly during the learning process, while others remain stable over time.

Not only are there trillions of precise one-to-one connections between neurons, but some also release neurotransmitters in different directions, affecting many other neurons at once.

To replicate the human mind, we need to map all these different kinds of interactions.

And there are many factors that affect neuronal signaling that are poorly understood and undiscovered.

To give one example, the pattern of activity between neurons is influenced by a type of cell called glia.

Glial cells wrap around neurons, and some scientists claim that there are 10 times more of them than neurons.

In the past, glial cells were thought to simply be structural supports, and although their function is still poorly understood today, at least some of them produce their own signals to influence information processing.

Because we know so little about the brain, we don't even know what to scan to replicate the mind.

Today, the brain of a living human can be scanned at a resolution of about half a millimeter using the most advanced non-invasive method known as MRI (Magnetic Resonance Imaging).

To detect synapses, you need to scan at a resolution of 1 micron, 1/1000th of a millimeter.

To get an accurate picture of the types of synapses and the strength of each synapse, we need even higher resolution.

MRI produces a strong magnetic field

So scanning at a resolution high enough to distinguish individual synapses requires a magnetic field strong enough to burn human tissue.

So to get this kind of leap in resolution, we need a whole new technology.

Scanning the brain of a dead person using an electron microscope would be more feasible, but even this technology is far from sufficient and requires the subject's life to end first.

Let's assume that one day we know enough about the brain, we know what to scan, and we've developed a technology that can safely scan it at the resolution we need. The next problem is to digitize and reconstruct this information.

The biggest barriers are computer processing power and storage capacity, both of which are improving every year.

Achieving this technical requirement is much closer than understanding and scanning the mind.

Artificial neural networks power Internet search engines, digital assistants, self-driving cars, Wall Street algorithmic trading, smartphones, and more.

No one has built an artificial network of 86 billion neurons yet, but as computer technology improves, it may be possible to control such massive datasets.

At every stage of scanning and uploading, you have to accurately process all the information you need, or you never know what kind of destructive minds will pop up.

While uploading minds is theoretically possible, it will probably take hundreds of years before we have the technology and scientific knowledge to make this a reality.

And that reality will require ethical and philosophical considerations: who can access mind uploads?

What are the rights associated with uploading hearts?

How could this technology be abused?

Even if we could eventually upload our minds, the question remains: "Should we?"

On December 7, 1941, 16-year-old Aki Kurose shared the terror of millions of Americans when Japanese fighter planes attacked Pearl Harbor.

What we didn't know at the time was that the terror we shared together would soon result in her family and more than 120,000 Japanese Americans being socially and physically excluded from the country.

In 1941, the Japanese American community had been expanding in America for about 50 years.

One-third of them were immigrants, people who had moved to the West Coast and had lived there for decades.

Others, like Aki, were American citizens born and raised in America.

Born Akiko Kato in Seattle, Aki grew up in a diverse neighborhood and thought of herself as nothing but an American until the day after Pearl Harbor, when her teacher told her, "People from your country bombed Pearl Harbor."

Because of racism, suspicion, and fear of sabotage, people viewed Japanese Americans as potential traitors.

The FBI conducted house searches, seized property, and detained community leaders without trial.

Aki's family wasn't immediately hit by these extreme crackdowns, but on February 19, 1942, President Roosevelt issued Executive Order 9066.

The order allowed anyone suspected of being an enemy to be removed from "areas deemed important for military activity," including those of partial Japanese descent. Initially, Japanese Americans were ordered to leave designated areas and move inland.

But when the government started freezing their bank accounts and imposing local rules like curfews, many people were unable to evacuate, including Aki's family.

In March, a proclamation was issued banning Japanese Americans from moving, and they were confined to a military zone.

In May, the U.S. military moved Aki and her family, along with 7,000 Japanese Americans living in Seattle, to Camp Harmony in Puyallup, Washington.

It's one of the makeshift concentration camps built on what used to be fairgrounds and racetracks, where entire families were crammed into crudely converted stables and barracks.

Over the next few months, American forces moved Japanese Americans to long-term internment camps in the remote West and South, which led Aki's family to Minidoka, in southern Idaho.

Many of the camps were still under construction when the inmates were moved under guard by armed soldiers.

The makeshift camps were overcrowded and unsanitary.

People often got sick and didn't have decent medical care.

The Wartime Relocation Service had inmates run camps.

Many worked in camp facilities, taught in poorly equipped classrooms, and raised crops and livestock.

Some Japanese Americans staged labor strikes and protests.

But many, like Aki's parents, persevered.

They tried to recreate what life was like outside the camp, but they couldn't avoid the reality of their circumstances.

Like many young inmates, Aki was determined to leave the camp.

After graduating from high school in Minidoka, she was able to attend Friends College in Kansas with the help of an anti-racist Quaker organization.

But it wasn't until late 1944 that things started to change for Aki's family.

A landmark Supreme Court ruling made the continued detention of unsuspecting American citizens unconstitutional.

In the fall of 1945, the war ended and the concentration camps were closed.

The last remaining inmates were given only $25 and a train fare to their pre-war address, but many were left without a home to return to or a job to return to.

Aki's family was able to keep the apartment, and Aki moved back to Seattle after college.

But post-war prejudice made it difficult to find a job.

The inmates faced discrimination and anger from the workers and residents who came on their behalf.

Luckily, Japanese Americans weren't the only ones facing racism.

Aki got a job with one of Seattle's first multiracial unions and joined the Congress of Racial Equality.

She became a teacher, and over the decades her multicultural and contextual education impacted thousands of students.

But many former inmates, especially the older generation, were unable to rebuild their lives after the war.

The children of the inmates started a movement calling on the United States to atone for its historic injustice.

In 1988, the U.S. government formally apologized for wartime internment, acknowledging it as a disastrous consequence of racism, paranoia, and a failure of political leadership.

Three years after this apology, Aki Kurose was awarded the United Nations Human Rights Prize by the United Nations Seattle chapter in recognition of her vision of peace and respect for people of all backgrounds.

100 years ago, there were 2,000 varieties of peaches, and almost 2,000 varieties of plums and 800 varieties of apples grown in the United States.

Today, only a fraction of them remain, and those survivors are threatened by agricultural industrialization, disease and global warming.

Endangered varieties include, for example, the Brad Kring, a red-fleshed peach brought to America by Spanish missionaries and cultivated by Native Americans for centuries; apricots brought by Chinese workers who built the transcontinental railroad;

None of the species are native to America

What's more, almost all of our fruit trees are imported: apples, peaches, cherries.

More than just food, these fruits have our culture embedded in them.

The very people who tended and nurtured the fruits brought them here because they thought they were important as a link between themselves and their homeland, and the way people inherited and shared the fruit trees.

In many ways, those fruits are our stories.

I had the opportunity to learn that while working on my work, "Tree of 40 Fruits."

"The Tree of 40 Fruits" is a single tree, but it bears 40 different drupes.

Peaches, plums, apricots, nectarines and cherries all grow on one tree.

For most of the year, the tree is structured to look like a normal tree, but in the spring it blooms with a variety of pink and white flowers, and in the summer it bears a wide variety of fruit.

When I embarked on this project, I saw it purely as art. I wanted to make a difference in everyday reality, and more specifically, to surprise anyone who saw this tree blooming in different colors and bearing different fruits.

The "Tree of 40 Fruits" was created using a method called grafting.

Collect and store the cuttings during the winter. In the spring, graft the cuttings onto the ends of the branches.

After all, almost all fruit trees are grafted, because the seed of a fruit tree is a genetic variant of the original tree.

So once you've found a genotype that's good for you, the way to propagate it is to cut off a piece of that tree and put it on another tree. It's pretty amazing when you think about it.

Conversely, it also means that fruit trees cannot be stored by seed.

I've known about grafting since I was a kid.

My great-grandfather was a grafter of peaches in orchards in southeastern Pennsylvania.

I've never met him in person, but everyone says that as soon as I mention my great-grandfather's name, he was someone who knew how to graft, either by magic or by arcane methods.

The reason I chose the number 40 in "The Tree of 40 Fruits" is that this number is not quantifiably large or infinite in Western religions, but it is too large to count.

It's a good amount, a lot.

And when I actually started, the problem was that I couldn't find 40 of these fruit trees, even though I live in New York State, which was the top producer of these fruits a century ago.

So when a research orchard or an old, historic orchard is about to be uprooted, I collect the branches from it and graft them in my nursery.

This is what the "Tree of 40 Fruits" looked like when it was first planted, and this is what it looked like six years later.

It's not an activity that yields any immediate results. (Laughter) It takes a year to know if the graft was successful, two or three years to know if the branch will bear fruit, and it takes up to eight years to produce a single tree like this.

Each cultivar grafted onto the 40 Fruit Tree has a slightly different shape and a slightly different color.

Then, by assembling the chronological sequence of the order in which each flower blooms within a single tree, we can design how this tree will look in spring.

The tree looks like this in the summer

Fruiting from June to September

Cherries first followed by apricots Plums, nectarines, peaches There seems to have forgotten one thing somewhere on the tree

(Laughter) This is a work of art, but it exists outside the gallery, and as long as the project continues, it's also a conservation of species through the art world.

When people ask me to plant trees like this in different places, what I do is research the seeds that are native to that place, and the seeds that have historically been grown there.

Before long, the project was all over the internet, and it was both scary and humbling.

I say scary because I've seen so many pictures of the Tree of 40 Fruit tattoos.

(Laughter) Why would you do that to your body?

(Laughter) The humbling part is that pastors and Jewish rabbis and priests have told us that they want that tree to be the centerpiece of their rituals and celebrations.

Eventually, it will also become a topic for articles on the Internet, although the answer is "I hope it's different."

[Marriage is like making a "tree of 40 fruit"? ] (Laughter) As an internet fad, I was interviewed by the Weekend Edition of NPR, and I wondered if this was the peak of my career as a college professor, and if it was the pinnacle of my career.

A few weeks after my NPR interview, I got an email from the Department of Defense.

The Defense Advanced Research Projects Agency approached us to discuss innovation and creativity, and the conversation quickly shifted to food security.

Yes, national security is built on food security.

Our agriculture is monocultured, growing just a few seeds of each crop, and once one of those seeds fails, it can dramatically change our food supply.

The key to food security is preserving biodiversity.

A hundred years ago, anyone with a garden or a few trees in their backyard was responding to this challenge by growing varieties that had been passed down through generations.

Here's a plum from one of the 40 Fruit Trees in a week in August.

After a few years of doing this project, my collection of drupes is said to be one of the largest in the eastern United States, and as an artist, it's terrifying.

(Laughter) What did you collect without knowing what it meant?

I later found out that many of the seeds I collected were called "heirloom seeds," and they were grown before 1945, before the dawn of industrial agriculture.

Some species date back thousands of years.

When I realized how rare it was, I felt obligated to preserve it, and art was the way to do it.

Older vintage orchards were visited before the fruit trees were uprooted, to preserve the trunk or trunk, including the original joints of the graft.

Began to make flowers and leaves for herbarium specimens

I also started sequencing DNA.

But the best part of all is that I've started documenting that story with copperplate etching and letterpress printing like this.

Here's the story of the George IV peach: This tree, which grew between two buildings in New York City, became a popular commercial variety in the 19th century after someone passing by tasted it.

Then it disappeared entirely because the fruit was not transportable and was not suitable for modern farming.

When I heard that story, I thought I should tell this properly.

Any attempt to tell the story must be accompanied by the experience of being able to touch, smell and taste the seed.

So I started preparing to grow these fruits and create an orchard so that everyone could have access to them, and this orchard would be located in the most densely populated area possible, of course.

I started looking for an acre in New York City. (Laughter) In hindsight, that was pretty ambitious. Maybe that's why nobody responded to my calls and emails. (Laughter) Eventually, four years later, I got a response from Governors Island.

Governors Island is a former naval base that was ceded to New York City in 2000.

The city has opened up the entire island, five minutes by ferry from New York.

They're doing a project, which I'm calling the Open Orchard, to bring back a fruit variety that hasn't been cultivated in New York for a century.

Open Orchard is currently underway, and will grow 50 multi-grafted trees to produce 200 varieties of heirloom and ancient fruit.

The cultivar is native to or once cultivated in this region.

For example, early strawberry apples are native to the corner of 13th Street and 3rd Avenue.

Since fruit trees cannot be preserved by seed, Open Orchard acts as a living gene bank, or vault, for these fruit trees.

Like "The Tree of 40 Fruits," it's an experimental and iconic endeavor.

And what I want to emphasize is that it's going to get more people involved in conservation and learning about food.

Through The Tree of 40 Fruits, I received thousands of emails asking the basic question: "How do you plant a tree?"

With less than 3 percent of people having a direct connection to agriculture, Open Orchard allows people to participate in public programs and workshops where they learn how to graft and grow fruit trees, pruning and harvesting, and even participate in fresh-picked tastings and flower-viewing tours.

And not just on the spot in the orchard, you could make a recipe book with all those recipes.

Orchard field guides will tell the nature and characteristics of each variety, their origins and their stories.

I grew up on a farm, so I thought, "I know farming, but I don't want to be involved."

And when I became an artist... (Laughter) Something that was in my DNA seemed to work.

it's not just me

100 years ago, we were much more closely connected to the culture, the cultivation, the stories of what we were eating.

The opportunities that Open Orchard creates will not only help us learn about this little-known past, but also help us think about what the future of food might look like.

thank you

(applause)

If you're anything like me, in a sunny San Francisco summer, you're doing this: an experimental kite-powered hydrofoil that hits over 30 knots.

The wind has incredible power and can do amazing things.

And one day, a ship not so different from this one will probably break the world speed record.

Kites are not just children's toys

Kites: Let's take a quick look at their history, and then let's talk about the glorious future of children's favorite toys.

Kites have a history of more than 1,000 years, and in China they were used for military purposes and even carried humans.

I knew at that point that I could carry heavy things.

I don't know why this guy has holes

(Laughter) In 1827, in the English countryside, a man named George Pocock had a kite-drawn chariot race against a horse-drawn chariot.

And, of course, in the early days of the aviation industry, a lot of inventors -- Hargreaves, Langley, the inventor of the telephone, Alexander Graham Bell -- were trying to fly kites.

And then these two guys came along and flew the kites to develop the flight control system that finally made possible manned powered flight.

Orville and Wilbur Wright brothers, Wright Flyer, of course.

Their kite experiment created this historic moment, powered off and the world's first manned flight of 12 seconds.

It was a great start to the future of commercial aviation.

Unfortunately, this turned the kite back into a child's toy.

But that was until the energy crisis of the 1970s.

An incredible man named Miles Lloyd, living just outside of San Francisco, published in the Journal of Energy a revolutionary paper that was completely ignored at the time: he used an airplane attached to the end of a string to generate enormous amounts of electrical energy.

The key to his discovery was that a free-flying wing could travel more through the air and produce more power per unit time than a fixed-wing turbine.

Fixed-wing turbines have evolved to a hub height of 100 meters, but you can't go much higher, but at higher altitudes there's more wind -- twice as much power.

Let's jump to the present, the energy crisis is still there, we have weather anomalies, and humanity is generating 12 trillion watts, or 12 terawatts, from fossil fuels.

Al Gore talked about why we need to hit one of those three goals, which is to say, we need to somehow generate 10 trillion watts of clean energy in the next 30 or 40 years.

Wind power is the second largest renewable resource after solar power, with 3600 terawatts, 200 times more power than humanity can handle.

Most of them are at altitudes above 100 meters and we don't yet have the technology to get there.

And so a new era of kites dawns.

This is our Maui proving ground, flying kites

What I'm showing you is the first autonomous power generation from every child's favorite toy.

It's impossible to fly something like this for thousands of hours unless it becomes a robot.

I feel a little sick

This is actually producing 10 kilowatts of electricity, enough to power almost five American homes, and a kite that's a little bigger than this piano.

And the most significant thing here is that we're developing control systems that, like the Wright brothers, can sustain flight for long periods of time.

No problem in places like this

This is the kite version of "Peeing on the Snow," and it's writing your name in the wake of it in the sky.

I'll show you my future plans

Beyond the stage of the Wright Brothers

We're developing megawatt-class equipment that will produce vast amounts of clean energy at altitudes of over 600 meters.

How big is this machine?

Yes, this paper plane - oops!

This can roughly start the mobile phone

A Cessna plane would be around 230 kilowatts.

If you can lend me a Gulfstream plane, I'll pull off a feather and generate a megawatt

A Boeing 747, six megawatts, is more than today's largest wind turbines.

A Spruce Goose H-4 would be 15 megawatts.

Is it reckless? isn't it

But recklessness has happened many times in past history.

This was a refrigerator factory, but it was churning out planes during World War II.

Before World War II, plane production was 1,000 a year

By 1945, they were building 100,000

With this production system, and if we can make 100,000 units a year, we can meet the total power demand of the United States in 10 years.

So this is the reckless story of a young man full of dreams and lots of friends.

Luckily I'm with 30 friends

And we need to support the dreams of people doing crazy things out there.

thank you

(applause)

We live on a tiny, watery planet in the vastness of space. Billions of years ago, from the same elements that made up the inanimate objects around us, single-celled organisms evolved, multiplied, and splendidly expanded into complex life forms.

All of these, animate and inanimate, minute and gigantic, are governed by mathematical laws with seemingly arbitrary constants.

So the question arises: if the universe is completely governed by such laws, wouldn't a sufficiently powerful computer be able to simulate them accurately?

Isn't our reality an extremely sophisticated simulation created by a far more advanced civilization?

This idea may sound like science fiction, but it's been seriously considered.

Philosopher Nick Bostrom makes a compelling argument that we're in a simulation, and some scientists think it's possible.

Those scientists started thinking about experimental ways to see if the universe was a simulation.

We hypothesize what the constraints of the simulation are and what detectable symptoms they might produce.

Where to look for such signs?

One idea is that when you're running a simulation, errors accumulate over time.

To compensate for such errors, the simulator may adjust natural law constants.

The change will be small, say, there is a constant that has been measured to a precision of parts per million, and it has been stable for decades, so if there is a change, it should be even smaller.

If we can improve the measurement accuracy of such constants, we may be able to detect subtle changes over time.

Another thing to look at is the finiteness of computing power, and no matter how powerful you are, you can't simulate infinity.

If space-time were continuous, there would be an infinite number of points in any small space in the universe, making it impossible to simulate with finite computing power.

So simulations need to represent space-time in small units.

it will be so small that you can hardly see it

But if you probe with some subatomic particle, you might be able to find it.

The basic principle is that the smaller the object, the more sensitive it is to disturbances.

The units of space-time are so small that most things will pass through them undisturbed, not just macroscopically large objects, but molecules, atoms, even electrons, and even many of the subatomic particles that have been discovered.

If we discover a small unit of space-time, or detect changes in the constants of the laws of nature, does that prove that the universe is a simulation?

no it's just the first of many steps

There may be other explanations for such findings.

We need more evidence to establish the simulation hypothesis as a natural science theory.

No matter how many tests we devise, we are limited by the assumptions common to all of them.

At the quantum level, we can only now understand what is known as the Planck scale.

A space-time unit of that size cannot be found in current science.

There are many things that are larger than the Planck scale but smaller than we can currently observe.

Similarly, changes in the constants of the laws of nature occur very slowly, and may take as long as the lifetime of the universe to be observed.

So even if it's not detected over hundreds or thousands of years, it could still be changing.

It's tempting to think that the devices simulating this universe (if they exist) do the same calculations as we do and have the same computational limitations.

In fact, we have no way of knowing what the constraints and methods of that civilization are, but we have to start somewhere.

It may not be possible to prove with certainty whether the universe is a simulation, but we will nevertheless continue to push the boundaries of science and technology in pursuit of the question, "What is the nature of reality?"

After being battered by waves for eight days at sea, Väinämöinen, a mighty poet and sage as old as the world, washed ashore on the distant shores of Pohjola.

Unlike Wainamöinen's hometown of Kalevala, Popoyola was a dark, icy land ruled by the "Witch of the Gaptooth of the North" Louhi.

The cunning Rouhi nursed Väinämöinen, but demanded a reward in return for returning him to his homeland.

Unsatisfied with gold and silver, he demanded a "sampo" that did not yet exist in this world.

Sampo was made from the tip of a swan's feather, the purest milk, a grain of barley, and the finest lamb's skin, and was called the "Eternal Source of Wealth."

But Väinämöinen knew that only Seppo Ilmarinen, the Eternal Blacksmith who created the sky, could make Sampo.

So I persuaded Louhi to bring in a blacksmith who makes sampos.

Väinämöinen returned home to Kalevala after a difficult journey.

But Ilmarinen refused to go to the gloomy northern lands of witches and cannibals.

So, in order to keep his promise, Väinämöinen tricked Ilmarinen into climbing a huge tree and summoned a great storm to carry Ilmarinen to Pohjola.

Ilmarinen was welcomed in the northern lands

Louhi was generous and lavishly hospitable to his guests, and even promised to marry his beautiful daughter on the condition that he would make what he wanted.

Finally, Louhi asked if he could make a sampo, and Ilmarinen declared that he would definitely make one.

He tries to manipulate the furnace to his will, but the flames create other artifacts, artifacts that, despite their beautiful appearance, are brutal in nature.

Graceful crossbows thirsted for blood, and pale plows ruined especially plowed fields.

At last Ilmarinen summons the wind to move the bellows, and within three days he pulls out of the flames of the furnace a sampo with a colorful lid.

Ilmarinen made a millstone to produce grain, a millstone to produce salt, and a millstone to produce money.

Louhi was very pleased with Sampo's power to create things without limits, and immediately ran into the depths of the mountain to hide Sampo.

On the other hand, when Ilmarinen demanded a reward, his fiancée refused to marry him, and he ended up returning home alone.

Years passed, and while Pohjola prospered, Ilmarinen and Väinämöinen had neither wives nor wealth.

Väinämöinen, outraged at the injustice, proposed a voyage to recapture Sampo, and the two, with Lemminkäinen's help, sailed to the northern lands.

When they arrived in Popoyola, Wainamöinen demanded half of Sampo's profit.

Louhi is angered by this request and raises an army to fight them.

When the Rouhi army was ready, Wainamöinen played his magic harp kantele, which enchanted all who heard it and fell into a deep sleep.

And the three brave men took the sampo without difficulty and quietly fled.

Lemminkäinen was so ecstatic at his success that he asked Väinämöinen to sing the song of victory.

He refused, knowing the danger of celebrating prematurely.

But three days passed, and Lemminkäinen, who could not contain his joy, thoughtlessly sang the song.

His terrible singing awakened the nearby cranes, and the shrieking of the cranes awakened Popoyola's army.

the army has marched

As the warship approached, Väinämöinen lifted a rock and destroyed the hull.

Rouhi dodged this attack, transformed into a giant eagle, carried soldiers on his back, and attacked the three men's ships.

As soon as Louhi tried to grab Sampo with his claws, Sampo fell into the sea and was shattered into pieces, sinking deeper than Louhi's claws could reach.

Buried on the sea floor, the powerful sampo fragments continue to produce sea salt under Ahti, the god of the deep sea.

(Imitate a cat's voice) It's a mimicry of a fishing cat.

(Recording of fishing cat calls) They love water, they love to fish, and they live in some of the most unique and valuable ecosystems on the planet, the wetlands and mangrove forests of South and Southeast Asia.

Isn't it great to catch fish?

(Laughter) The fishing cat is one of the 40 wildcat species.

Similar to tigers and lions, but much smaller

It's about twice as big as a domestic cat.

In Indonesia, we say "kucing bakau," which means "mangrove cat."

I like to call it "tiger in the mangrove forest"

We don't know as much about fishing cats as we do about tigers, but what we do know is that they can play an important role in the world's ecosystems, and they can be high-profile billboards for environmental protection.

You fell in love, right?

(Laughter) Like so many other endangered species, fishing cats are under threat, largely because the global demand for farmed fish and shrimp has wiped out nearly half of the old mangrove forests in South and Southeast Asia.

On the other hand, mangrove forests are not just homes for fishing cats.

It's also home to all kinds of wonderful creatures, like jackals, turtles, waterfowl, and otters.

(Laughter) Mangrove forests prevent soil erosion and act as the first line of defense against typhoon surges and tsunamis for millions of people living nearby to survive.

Adding to the other fact, to cool the planet, mangrove forests absorb 5-10 times more CO2 than rainforests.

Protecting an acre of mangrove forest is equivalent to protecting 5 to 10 acres of normal rainforest.

If you want to get rid of all the CO2 you give off in your lifetime

Mangrove forests will be one of the most cost-effective ways to protect your environment.

Deforestation, extinction and global warming are global problems that can be solved by valuing life and ecosystems and working with the local people who live nearby.

This is one of the deltas on the coast of South India, where communities are working together to change the status quo and the future of our planet.

In less than a decade, with international support, and with the collaboration of the national forestry department and local people, more than 20,000 acres of non-productive aquaculture ponds have been regenerated into mangrove forests.

About five years ago, in this regenerated mangrove forest, we found...

When I showed this photograph of fishing cats to local people, it seems that they felt proud of having such a world-respected endangered species and ecosystem close at hand.

I've also been able to build trust with some of them and help them find alternative ways to make a living.

Santosh is a 19-year-old young man who has worked with us for over a year and not only has he become a conservation professional, but he has also enlisted the help of many local fishermen to research and protect fishing cats.

Moshi was a poacher, but not only did he stop poaching and become an invaluable environmentalist, he also used his traditional knowledge to educate local communities not to hunt fishing cats, otters, and other endangered species that live in the mangrove forests near them.

Farmers like Venkat are happy to work with us as environmentalists, whether it's harvesting crabs from mangrove forests or possibly honey, to test sustainable ecosystem services.

We need something to motivate local people to protect and restore lost mangrove forests.

A win-win between the three parties, the fishing cat, the local people, and the world.

As a result of these activities, in the future, fishing cats and lost mangrove forests will be protected and regenerated by fishermen themselves in the future, which will create carbon sinks and reduce total emissions.

A fishing cat may be small, but I hope we can help make it big.

Let's put all our efforts into it, so that life on earth can survive a little longer.

Would our friends say

(recording of fishing cat barking) Thank you

(applause)

I was sitting at a bar with two friends, a married couple.

They have two young children, they're married and have seven degrees in total.

The questions they asked were the ones I've been asked more than any other question.

They said, "Hey, Emily, how do couples stay sexually stable for decades?"

I'm a sex educator, and my friends ask me this question.

I love science, so I can give you something like an answer to this question.

There's solid evidence in this area of ​​research. Couples who maintain stable sexual bonds over decades have two things in common.

But before I could tell my friends what it was, I had to tell them a few other things.

Couples who have frequent sex don't necessarily maintain stable relationships.

Few people have sex often

I'm busy

And it's not just people who have wild, adventurous sex.

In fact, a recent study found that the strongest predictor of couples who were most likely to be fully satisfied with sex and their relationship was not the type, frequency or location of sex, but whether they hugged after sex.

Nor are they necessarily desperate to touch each other all the time.

there are couples like that

They feel what researchers call "spontaneous cravings," cravings that seem to come out of the blue.

Cartoonist Erica Moen, who illustrated my book, depicts spontaneous desire as lightning striking your genitals Dawn! I want it all of a sudden

This is certainly one of the classic, healthy ways to feel sexual desire.

But there's another healthy way to feel sexual desire.

It's called "responsive needs."

Spontaneous desires appear to arise in anticipation of pleasure, whereas responsive desires appear in response to pleasure.

Christine Hyde, a sex therapist from New Jersey, shared a wonderful metaphor for speaking to her clients.

Let's say your best friend invites you to a party.

I'll answer if I go, right?

But as the day approaches, I start thinking, "Oh, the streets are going to be busy.

I need to find someone to take care of my children

Do you really want to go to the party in casual clothes this weekend? "and

But anyway, I'll dress up and attend. What happens?

have fun at the party

If the party was fun, it means it went well.

The same goes for sexual ties.

Put on your casual clothes, find someone to take care of your kids, crawl into bed and touch your partner skin-to-skin, your body wakes up and remembers, "Oh yeah, I love this."

I like this person! "and

This is responsive need, and it's the key to learning about couples who maintain stable sexual relationships over the years.

I have a particularly strong belief in

Relationship researcher, therapist, and founder of Emotional Focused Therapy, Sue Johnson, sums up "trust" with the question, "Will you stay by my side?"

Further, "Is your heart open to me here and now?"

friends are by each other's side

this is the first

The second characteristic is that they prioritize sex.

They decide that sex is important to their relationship.

They choose to put off all the other things they can do without sex, like taking care of their kids, going to work, other family members they have to care for, other friends they want to spend time with.

Just watching TV and wanting to go to bed is out of the question.

Take a break from all this and create a sheltered space Just crawl into bed and touch your partner skin-to-skin

Those two things are the key: make good friendships and sex a priority.

I told my friend this story at the bar.

Good friendships and prioritizing sex, parables of parties and skin-to-skin contact with partners

Then one said, "Wow..."

(Laughter) I said, "Okay, that's the problem."

(Laughter) Not wanting to go to parties isn't necessarily the problem.

If your problem is a lack of spontaneous desire to go to parties, then you know what to do.

So you can enjoy the party and all is well

But the problem with my friends was that they didn't like the food served at the party, they didn't like the music, and they weren't entirely sure they were on good terms with the other attendees.

It's common for lovely couples who love each other to become afraid of sex.

If you get sex therapy, the therapist might make them stand and keep them as far apart as they feel comfortable.

And the real problem is that it's not just space between two people.

It's swirling with complaints that have accumulated over the weeks and months: "You don't listen to me," "I don't know what you don't like, but I don't want to be criticized," "If you love me, do this," and "Your heart isn't here."

It's probably years of these intractable feelings that have piled up.

In my book, I used a strange metaphor. I likened these feelings to sleepy hedgehogs.

Couples struggling to maintain a stable sexual bond are filled with these sleepy hedgehogs.

This can happen in any long-term relationship.

I'm sure you're raising an itchy, sleepy hedgehog between you and that special someone.

The difference between couples who maintain a stable sexual relationship and those who don't is not that the former don't experience difficult and hurt feelings, but that they face those feelings with kindness and compassion in order to let the hedgehog go and face each other again.

Here, my friends were faced with more questions hidden beneath questions, not "How can I maintain a stable connection?"

"How can we get back to a stable connection?"

There is a field of science that can answer this question, but one of the things I've learned in my 25 years as a sex educator is, Emily, sometimes the science tells the story less.

So I told them my story

I spent months writing a book about the science of healthy female sexuality.

I was thinking about sex all day, every day, because this project was so stressful that I didn't want to have sex at all.

I spent months traveling everywhere for research, talking to anyone who would listen to me about the science of healthy female sexuality.

By the time I got home, yes, I changed into my otherworldly clothes, crawled into bed, and tried to touch my skin, but I was so exhausted and overwhelmed with emotion that I just cried and went to sleep.

I was alone for a few months, feeling scared, lonely and frustrated.

A lot of hedgehogs were growing

The person I love and respect and who should be my best friend felt so far away.

but…

he was always by my side

No matter how many difficult feelings I had, he faced them with kindness and compassion.

never turned my back

What was the second characteristic of couples who maintained a stable sexual relationship?

I prefer sex

They are determined that sex is important to their relationship and that they will do what it takes to get back on track.

Sex therapist and researcher Peggy Kleinplatz asks:

"What kind of sex do you think is worth asking?"

My partner and I looked at the quality of our relationship and what sex gave us in our lives, and we also looked at the sleepy hedgehogs I brought into my home.

and decided sex was worth it

Rather than deciding, we chose to do what we needed to do to get back into our relationship, one sleepy hedgehog, one by one, to face our difficult and hurt feelings with kindness and compassion, to let them go, and to get back to our relationship, the sexual bond that was important to us.

Stories like this are rarely told in the context of how sexual desire works in long-term relationships.

But it seems to me that the most romantic and sexiest thing is to be chosen as "the most important thing."

How can I maintain a stable sexual relationship over the long term?

You keep looking your best friend, your partner, in the eyes and choosing to get back together.

thank you

(applause)

I've been working with poverty for over 20 years. How do you define "poverty"? is the problem

We often think of poverty in terms of money, people who earn less than one to three dollars a day.

But poverty is complex, and income is just one variable.

because poverty is a lack of choice and freedom

And I had an experience in Kenya that deepened and clarified my understanding.

talk about the experience

I was in the slums of the Masari Valley with my photographer friend Susan Miseras.

Masari Valley is one of the oldest slums in Africa

About 5km from Nairobi, it measures 1.6km long and 0.3km wide, and more than 500,000 people live crammed together in corrugated huts.

It's tainted with prostitution, violence and drugs.It's a very difficult environment to grow up in.

The narrow alleys we walked through were untreated sewage and garbage, along with tiny houses that literally had no place to step.

But at the same time, there was human vitality, the aspirations and ambitions of the people who lived there, the women who washed babies and clothes and hung laundry.

I met a woman named Mama Rose, who has rented a little tin shack for 32 years and now lives with her seven children.

Four sleep in one twin bed and three sleep on the muddy linoleum floor.

She gets all the kids to school by selling water from her kiosk and selling soap and bread in her little shop.

This was the day after President Obama's inauguration, and I was reminded that Masali Valley is still connected to the world.

When I talked to kids on the street corner, they said, "Obama is our brother!"

And I said, "Obama is my brother, so you are my brother."

They tilted their heads and then held out their hands "High Five!"

And here I met a woman named Jane

I was immediately struck by the kindness and kindness on her face and asked her to share her own story.

She started talking about her dreams. She said, "I had two (dreams)

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.

I had to give up on my first dream and focus on my second dream. ”

She got married when she was 18 and soon had a child.

But when she turned 20, she became pregnant with her second child, her mother died, and her husband left her...and married another woman.

She was again in the Masari Valley with no income, no job, no money.

and she started prostitution

It wasn't as organized as we think

She would go into the city at night with about twenty girls to find work, and sometimes come back with a few shillings, and sometimes come back with no money.

She said, "Poverty itself is not so painful. What is painful is the humiliation and embarrassment of poverty."

But in 2001, her life changed.

Through a friend, she learned that there was an organization called Jami Bora that would lend as much as the amount of money she had saved, no matter how poor she was.

And she spent a year saving $50 and borrowing the money so she could later buy a sewing machine.

So she started tailoring clothes

And that's what I do now. She goes to the thrift market and for about three dollars and twenty-five cents, she buys me a ball gown.

Some of the clothes may have been donated by you.

And she adds ruffles and ribbons and retails to make fluffy clothes for women to celebrate such life milestones as a daughter's 16th birthday or her first sacred feast, for people of all economic backgrounds.

And her business is really thriving, I actually saw her walking down the street, and I noticed there were a lot of women out there to buy dresses.

As I watched her sell the dresses and jewelry that she made, I realized that Jane was making over four dollars a day.

She's no longer poor by any definition

But she still lives in the Masari Valley

and she can't get out of there

She lives with that precarious situation, and in fact, in January, tribal riots forced her out of her home and forced her to find a new hut to live in.

Jami Bora understood this very well, that when we talk about poverty, we have to look at people from all economic spheres.

And with patient capital from venture capital firm Acumen and other organizations, long-term financing and investment, Jami Bora built a low-cost housing complex about an hour outside of Nairobi's centre.

And they designed from the perspective of a customer like Jane herself, in a way that demanded a sense of duty and responsibility.

So she must provide 10% of the total property value of the mortgage, or about $400 of her savings.

And Jami Bora will match her mortgage amount to the hut rental amount.

In a few weeks, she'll be one of the first 200 families to move into the housing complex.

When asked if Jane had any fears or missed Masalli Valley, she replied, "What are you afraid of that you haven't faced yet?

I am an HIV infected patient. I've faced it all. ”

"What do I miss?

You think I miss violence and drugs? No privacy?

At the end of the day, do you miss not knowing if your children will make it home safely? If you give me ten minutes, I'll be ready to move. "said

So I asked, "What happened to your dream?"

she said. "Well, the dream I had when I was little isn't quite the same now.

I wanted a husband back then, but what I really wanted was a loving family And I love my children so much, they love me too. ”

"I wanted to be a doctor, but what I really wanted to be was someone who could help people, heal them, and cure them.

That's why I consider myself blessed now.Two days a week, I counsel HIV patients.

And I say, 'Look at me, you're not dead

you're still alive So you have to be useful for people. ] And she continued. "I'm not a doctor who gives medicine

But I may be giving them something better 'cause I'm giving them hope. ”

And in the midst of this economic crisis, many of us tend to be scared and withdrawn, but we need to learn from Jane, recognize that poverty is not normal, and offer a helping hand.

Because when systems are collapsing, like we're experiencing right now around the world, it's an opportunity for invention and innovation.

It's an opportunity for us to extend our services and products to all of humanity, so that we can build a new world where everyone can make their own decisions and choices.

Here, I believe, true dignity begins.

It's all because of people like Jane all over the world.

And it's a boon to ourselves as well.

thank you

(applause)

Ethic awakens from his slumber and is unfortunately greeted with three surprises.

The first one seems to be imprisoned for some reason

Second, I have no memory of it at all.

And third, something mysterious that I've never seen is trying to enter through the gap in the window.

His name is Hedge Ethic came to help save the world

But before that, we have to get out of here.

Hedge explains the challenge that awaits him when he transforms his hand into a picking tool.

All the locks on this prison door work in the same strange way.

Inside the keyhole is a red dial that can be set in 100 different positions, numbered from 1 to 100.

If you use the cell key, the dial will turn to the correct position, where it will turn green and the door will open.

But it doesn't look like they'll be able to steal the key from the guards. Hedge says he has a good idea.

Hedge can carry out Ethic's orders.

If Eschick says, "Take five steps forward, turn right, and take another five steps," Hedge will do just that.

But that requires precise instructions.

"Unlock" or "Try all dial positions" is too vague.

Once you're out of this cell, if you don't unlock the door to the outside within a short amount of time, you'll be caught by guards.

What instructions would you give Hedge to effectively open the door?

Pause the video and think for yourself

I'll give you a hint before I explain the answer.

The programming concept that holds the key to unlocking doors is the loop.

It's one or more instructions that repeats itself a specified number of times, like, "Jump up and down 100 times."

First, what's clear is that we have to find a way to make Hedge try everything until it finds the correct dial position.

It takes a little brain to figure out exactly how to do that.

One way is to tell Hedge to try each dial position in turn.

Check the light according to 1

When it turns green, open the door. Otherwise, set it to 2.

If that doesn't work either, adjust to 3 Continue this up to 100

But it's hard to write down all these steps.

Writing more than 100 lines of code is silly, if only three.

Here comes the loop

there are a few ways

There are 100 possible positions on the lock dial, so we can say, "Look at the color of the dial, advance the dial by one notch, and repeat 100 times."

Remember where the dial turned green, and have it go back to that point at the end. Specify the number of times it repeats.

But there's a more efficient way to do this: have them turn the dial one notch at a time until it turns green, and as soon as it turns green, stop and have them open the door.

This way you don't have to make a full circle when you're able to unlock in position 1.

This is called an "until loop" because it runs "until" some condition is met.

Another approach similar to this is to keep turning the dial while it's red, and stop when it's not.

This is called a "while loop"

back to adventure

Hedge cycles through the dial positions and the lock opens at position 41.

Ethic and Hedge manage to escape when there are no guards.

Ethic is soon faced with a choice: Hide inside a mysterious crystal, or break the lock on the outer door and escape.

Ethic chooses escape

The second door took a little longer and I had to turn the hedge to 93.

It's successfully opened, and here Hedge explains why he helped Ethic.

The world is in turmoil, and only Ethic can save the world from being invaded by robots.

To do so, you must collect three powerful items, which are now being used for nefarious purposes.

Only by collecting them can we go to the giant crystals at the heart of the machines that run the world, and take back the world.

Ethic managed to escape, but what kind of adventure did he embark on?

The Earth is 4.6 billion years old, but humans often live less than 100 years.

So why would you want to know about the history of the Earth, even though stories from the distant past seem irrelevant to everyday life?

As you know, as far as we know, Earth is the only planet in our solar system that has ever had life, and the only one that has the kind of machinery that allows us to sustain life.

Then why the earth?

We all know that the Earth is unusually tectonically tectonic, has liquid water on its surface and an oxygen-rich atmosphere.

But that wasn't always the case, and we know this from ancient rocks that document key moments in Earth's evolution as a planet.

One of the best places to see these ancient rocks is the Pilbara in western Australia.

The rocks we see here are 3.5 billion years old, and include some of the oldest evidence of life on Earth.

When you think of paleontology, you might think of a stegosaurus or a fish trying to climb onto land.

By paleontology, I mean microbes like bacteria.

Fossils of microorganisms are often preserved in layered rocks called stromatolites.

Most of the records we see of life on Earth for the first three billion years are fossils of these simple life forms.

The fossil record of humans goes back only a few hundred thousand years.

The fossil record tells us that organisms like bacteria gained a foothold between 3.5 and 4 billion years ago.

Rocks older than this have either been destroyed or have been significantly deformed by crustal movements.

So the remaining mystery is when and how life began on Earth.

This is the Pilbara's ancient terrain, created by volcanoes.

Little did we know that our research here would find clues to the origin of life.

During my first fieldwork here, towards the end of a week-long mapping project, I stumbled upon something special.

What looks like just wrinkled old rock is actually stromatolite.

In the center of this ridge was an unusual little rock, about the size of a child's palm.

It took me about six months to examine this rock under a microscope, and one of my mentors at the time, Malcolm Walter, suggested that it looked like geyser.

Intermittent rocks are rocks that only form around hot springs.

To tell you the importance of geysers, I have to go back several hundred years.

In 1871, in a letter to his friend Joseph Hooker, Charles Darwin wrote, "What if life had begun in a warm spring, and that various chemicals had gone through more complex changes from there?"

A "warm spring" is a hot spring.

Under these conditions, the hot springs dissolve minerals from underground rocks.

When this aqueous solution mixes with organic compounds, it becomes a sort of chemical factory, where research has shown that simple cellular structures can emerge, which could be the first steps in life.

A hundred years after Darwin's letter, a deep-sea hydrothermal vent was discovered underwater.

These are also like chemical factories.

This deep-sea hydrothermal vent is located in Tonga's volcanic arc, at a depth of 1,100 meters in the Pacific Ocean.

The black smoke that billows out of the chimney-like area is also a mineral-rich fluid that feeds the bacteria.

Ever since the discovery of deep-sea hydrothermal vents, life has been thought to have originated in the ocean.

There's good reason for this: deep-sea hydrothermal vents are common in ancient rocks, and the early Earth is thought to have been entirely covered by oceans and had very little surface.

The possibility that deep-sea hydrothermal vents were abundant on early Earth fits well with the theory that life originated in the ocean.

That said-

Our research at the Pilbara provides and validates new perspectives.

It took three years, but we were finally able to reveal that this rock is geyser.

This conclusion not only showed that there were hot springs in the Pilbara volcano 3.5 billion years ago, but that evidence for life in land-based hot springs extends back 3 billion years in the Earth's geological record.

So from a geological point of view, Darwin's "hot springs" could be a plausible origin of life.

Of course, how life began on Earth is a matter of debate, and it will continue to be so.

But it's clear that life has thrived, it's evolved in many ways, and it's more complex than ever.

Eventually, we reached the age of the human race, and humans began to explore their existence, to search for extraterrestrial life. Is there a community somewhere in the universe that awaits us, or is it just us?

Clues to this mystery also lie in the ancient rock record.

About 2.5 billion years ago, we have records that bacteria began producing oxygen, much like plants do today.

Geologists call the period that followed this the Great Oxidation Event.

This is illustrated by the rocks known as banded iron deposits, many of which are hundreds of meters in layers of rock that are exposed in valleys that run through Karijini National Park in western Australia.

The introduction of oxygen into the atmosphere caused two major changes on Earth.

First, complex organisms are now able to evolve.

For organisms to become large and complex, they need oxygen.

Then came the ozone layer, which protects modern life from the harmful effects of UVB radiation.

Ironically, microbes gave rise to complex organisms that, in short, ceded control of the planet for three billion years.

Today, humans mine the fossils of complex organisms for fuel.

This releases huge amounts of carbon dioxide into the atmosphere, and like our microbial ancestors, we're making big changes to our planet.

This effect has resulted in global warming.

Unfortunately, the ironic conclusion here could be the extinction of the human race.

So maybe the reason we can't get to extraterrestrial life is because intelligent life, even if it exists somewhere else, will go its own way to extinction once it's evolved.

If I could talk to a rock, I think it would say, "Life on Earth is precious."

It's the product of four billion years of delicate and complex co-evolution between life and the Earth, of which humans are the last tiny fraction.

You can use this fact as a guide, a prediction, or you can use it as an explanation for why humans are so alone in this corner of the universe.

Either way, use it to gain some perspective, to gain perspective about the legacy you want to leave behind on this planet you call home.

thank you

(applause)

For thousands of years, the British used copper to make tools, jewelry, and money to trade.

But around 800 B.C., this began to change. As the value of copper fell, societies fell into chaos, leading to economic crises and what we now call "recessions."

What causes the recession?

This question has been debated among economists for a long time, and for good reason.

A recession is a gradual decline in economic activity in one country over a period of months, or a downturn over many years that affects the world, and a state in between these two economic conditions.

To make things even more complicated, there are so many factors that influence economic conditions that it's hard to pinpoint a cause.

So it's a good place to start by looking at the big picture: A recession happens when there are negative forces that throw the supply and demand out of balance.

Any imbalance between the amount that people want to buy, the amount that producers can provide, and the price of those goods or services triggers a recession.

The economic relationship between supply and demand is reflected in the rate of inflation (price increase) or interest rate.

Inflation occurs when the price of goods and services rises.

In other words, the value of money goes down.

But inflation isn't always bad

On the contrary, low inflation is thought to stimulate economic activity.

But high inflation without strong demand hurts the economy and eventually leads to a recession.

Interest rates, on the other hand, reflect the cost to individuals and businesses to borrow money.

Interest is generally expressed as the annual rate that the borrower pays the creditor until the loan is paid off.

Low interest rates mean companies can borrow more money, which means they can invest in more businesses.

On the other hand, high interest rates impose higher costs on producers and consumers, slowing economic activity.

Fluctuations in inflation and interest rates give us an idea of ​​what's going on in the economy, but what causes these fluctuations in the first place?

The most obvious are catastrophic events such as natural disasters, wars, and geopolitical factors.

For example, let's say an earthquake causes a facility that produces oil or something else to collapse.

This could cause the supply side of the economy to raise prices for petroleum-based products, reducing demand and triggering a recession.

But it's precisely because the economy is thriving that it can go into recession.

Some economists believe that the expansion of markets causes economic activity to sometimes reach unsustainable levels.

For example, businesses and consumers may borrow more money, thinking that a growing economy will allow them to manage their debt burden.

But if the economy doesn't grow as fast as we hoped, we'll end up with a lot of debt that we can't afford to pay back.

In order to pay it off, we have to divert money from other economic activities and downsize our business.

Human psychology can also cause depression.

Recession fears hold back people's investment and consumption, leading to self-fulfilling prophecies (actions based on false beliefs turning false beliefs into reality).

In response, producers try to cut operating costs to prepare for the expected drop in demand.

And then you end up in a vicious cycle where the cost cuts eventually lead to lower wages, which in turn lowers demand.

Even policies designed to stem recessions can cause them.

When economic conditions are tough, governments and central banks issue money to encourage consumption and lower the central bank's discount rate.

In response, commercial banks cut interest rates, making repayments "cheaper" and spending more.

But these policies are short-lived, and eventually we need to do the exact opposite to prevent excessive inflation.

But when people rely too heavily on cheap debt and government stimulus, it's exactly the opposite policy that causes the recession.

Britain's copper depression was eventually ended by the introduction of iron, revolutionizing agriculture and food production.

Today's markets are more complex, and the recent recession is much harder for policy to solve.

But with new data from each recession, we can more effectively predict and respond to future recessions.

"Those who pass through this gate, abandon all hope." Written above the gates of hell, these ominous words darkly warn Dante as he descends into hell.

Despite this eerie tone, perhaps the greatest love story of all time, begins an epic journey involving man and God.

But in order for Dante to find salvation, he must first travel through hell.

The scene of torture, described as "Hell," is the introduction to an epic trilogy written by Dante Alighieri in the 14th century.

With himself as the protagonist, Dante journeys into the abyss of hell and witnesses a different and terrible punishment in each of the nine spheres.

Dante begins in Limbo and travels through the nine spheres through fornication, gluttony, greed, wrath, heresy, violence, deceit and betrayal, where sinners are held captive under Satan's eyes.

The journey continues in the following two parts, "Purgatory" and "Heaven", and Dante climbs the mountain of Purgatory and ascends the nine "heavens" of Heaven.

A trilogy written over a decade, The Divine Comedy is an allegory of the soul's journey in search of God.

But Dante's Divine Comedy is much more than a religious allegory.

It's also a witty and scathing critique of Italian politics.

Dante, a knight and statesman from Florence, was a devout believer but critical of the Roman Catholic Church.

He particularly disliked Simonia, who traded in spiritual things such as church nepotism and indulgence.

Many groups took advantage of this depraved practice, but only the Black Party defended it.

This was a political and religious faction that sought to expand the pope's political influence.

Dante was a member of the White Party and believed that Florence should be more free from Roman Catholic influence.

Dante often criticized the pope's power as a representative of the White Party's citizens, although the Blacks used that position to banish Dante from Florence in 1302.

Yet Dante is not silent, and permanent banishment creates great criticism.

Disgraced and with little hope of returning home, Dante freely voiced his dissatisfaction with the church and Italian society.

By writing The Divine Comedy in Italian (Tuscan) instead of the traditional Latin language used by the educational elite, Dante broadened the readership of his cutting-edge political commentary.

In the Wrath of Hell, Dante eagerly witnesses the sinners tearing the limbs of Black Argenti.

In the realm of deception, Dante speaks with a mysterious sinner who burns in the hottest flames.

He finds out that he is Pope Nicholas III. According to the pope, if the two heirs who follow him also die due to the sins of Simonia and the Fall, they will be dropped here.

"Hell" has a dark and sometimes violent image, but "Kamikyoku" is also a love story.

Dante married his fiancée, the daughter of a Florentine magnate, but since he was nine years old he had been in unrequited love for another woman, Beatrice Portinari.

Even though we met only twice, she was Dante's lifelong muse, inspiring and the subject of many of his works.

In the work, it was Beatrice who led Dante on a daring journey down the abyss of hell and up the mountain of purgatory.

As a powerful and divine figure, Beatrice guides Dante through the concentric spheres of "Heaven" and finally brings him face-to-face with God.

In the centuries since "The Divine Comedy" was published, its themes of love, guilt and redemption have been explored by artists like Rodin, Dali Ezra Pound, Neil Gaiman and many others.

And Dante was finally rescued when Florence lifted his banishment in 2008.

I write a technology review for the New York Times every week.

The content is the latest equipment and topics related to it

At this time of year, most of the ideal father's job is to hang out with his kids and decorate the Christmas tree.

All I do is appear on cable television and answer the same question, "What are the tech trends for the next year?"

I am also asked, “Are there any changes compared to last year?”

But I'd like to pick one of the most interesting of those questions: the convergence of mobile phones and the Internet.

This image of a volcano, which I found on Google Images, looks just like the cover of Dianetics.

(Laughter) Anyway, it all started a few years ago, and it's come a long way since it started carrying audio over the Internet instead of over phone lines.

But it's kind of like Vonage, which is interesting in its own way.

A landline phone is plugged into the little box provided and connected to a cable modem

Works like a regular phone

You can receive calls, you can hear the dial tone, but that's just a hoax. The dial tone is a WAV file, just to reassure you that the world isn't over.

The dial tone can be anything, it can be salsa music, or even a skit, it can be anything.

The little box stores your phone number.

Isn't it amazing? You can take it to London or Siberia, and your neighbor can call your house and the phone will ring.

It has all the known features, because adding new features was just software.

I don't like the term VoIP, but with the advent of over-the-wire calls, landline usage dropped by 30 percent in three years.

Independent college students don't have landlines anymore

The most likely thing for them is Skype, the most popular VoIP service in the world.

It's a free download for Mac and Windows, and you can make free calls anywhere in the world.

this is not your phone it's your computer

If you're a college student and you don't have money, it's definitely better than using your cell phone.

It's also nice for middle-aged people like me to use Skype, for example, when the kids go abroad for the first semester.

They don't want to pay for international calls, so it's going to be like, "Timmy! Is that you?"

(laughs) It's very cool.

At least when I did. (Laughter) I think the real interesting area for VoIP is when it was built into mobile phones.

Imagine if you had a regular cell phone and could make free calls all over the world whenever you were in a wifi hotspot without paying your phone company a penny.

It's pretty cool, but it's been five years since this technology has been available, and it's unbelievable that the number of standard cell phones with free VoIP offered by US carriers is zero!

I don't understand it at all!

(Laughter) Actually, I recently got one.

I would like to talk about this

T mobile sells

By the way, T-Mobile is not my sponsor.

No connection with T-Mobile

The New York Times is very strict about this.

Because that Jason Blair guy is the one who ruined everyone.

(Laughter) If you're not familiar with it, it's because it was just announced on June 29th of last year.

Does anyone remember what happened on June 29th of last year?

The iPhone was released

Can you imagine T-Mobile's campaign women? did you know?

“Hello, I have some news, wow!”

(Laughter) But it's actually really cool. You have the right to choose your phone. I'm not talking about smartphones, I'm talking about blackberries and regular phones with Wi-Fi.

That means you can make free calls anytime you're at a Wi-Fi spot.

And when you leave the spot, you're using your cell phone signal.

You might be wondering, "How many spots can I find?"

"You can always find me!"

Because you're given a home wireless router along with your phone.

This is clever, because T-Mobile should have been the most miserable phone company.

The radio wave area was about the size of my thumb nail.

(Laughter) It costs $100 million just to build a radio tower.

We don't have that kind of money, so instead, they're giving us a box of seven dollars and ninety-five cents, sort of like a covert radio tower construction operation.

We keep it at home for them!

Anyway, Europe has Wi-Fi phones.

But before T-Mobile, no company had done a seamless call transition when you moved from a Wi-Fi hotspot to cellular coverage during a call.

I put the camcorder on the phone and did it like this

(Laughter) While I was on the phone with my wife, I moved from a Wi-Fi hotspot to outside cell coverage.

(Video): Jennifer: Hello?

David: Hi, it's me

Jennifer: How are you?

David: You're using Wi-Fi, right? how does that sound?

Jennifer: I can hear you.

I'm leaving the house now. David: I'm going for a walk, okay?

Jennifer: Okay, I'm playing with the kids.

David: What are you guys doing?

Here it is!

Here the base station was switched during the call

I don't understand why my wife says I don't listen to her

(Laughter) What's important is that the line between the internet and mobile phones is fading away.

The great thing about T-Mobile is that connectivity technology is very advanced, but billing technology has not caught up.

So you can make a call over your home Wi-Fi, and you can just sit in your car and talk until the battery dies, maybe 10 minutes. (Laughter) Calls are free forever.

because they... uh wait a minute

The opposite is also true

If you start a call while in cell coverage and go home, you'll continue to be charged.

So many of the people who use the service have gotten into the habit of saying, "I just got home, can I call you back?"

you understand

When you use a phone like this abroad, it doesn't matter what wireless spot you're in.

No one on the internet can tell you're a dog, right? I don't even know you're in Pakistan

You can make free, unlimited calls to the United States from your location with these phones, which is very interesting.

this is my other favorite

Is there anyone of you who is in range and is booting up and can make a call right now?

Could you please dial this number? [Show me your cell phone number] Please don't call me at 3am to get my printer fixed.

(Laughter) I have two cell phones, and it would be crazy if they both booted.

I know it's better not to demo technology in front of an audience, it's silly, isn't it?

I'm going to turn off this power. Ah, the ringer was off.

Turn off the other one too Now both will ring at the same time

wait a minute

hello?

Where are you calling from?

Just kidding. He's here. Thank you for doing this.

i didn't know it was you i was looking at this person

it was good! I need you to cut it

(laughs) Good! I was able to prove

Mute the ringtone, everyone wants to join

(Laughter) This is using "Grand Central." I'm not kidding!

(Laughter) I know your phone number!

(laughter) pay the bill

Grand Central is a great idea where they give you a new cell phone number, and when you get a call on one number, all your cell phones ring at the same time.

Home phone, business phone, mobile phone, yacht phone (this is unique to EG)

(Laughter) The great thing about this is that you never miss a call.

Most people would think, "Well, I don't want to be in constant contact."

But the great thing about this is that it all happens over the Internet, so we can take advantage of that great advantage.

So I send this message to my boss: "Hello Boss, I'm out of the office. Please leave a message."

If my wife calls, "Hello, please leave a message."

It's ever-changing

Google bought it and worked on it for a year

It is expected to hit the market with public methods soon.

Anyway this is a bummer for me

As you may know, when you call 411 on your cell phone, you'll be charged $2.

Did you know? It's terrible

I actually got a picture of a Verizon employee

Let me know how you can avoid being charged

I use Google phone

It's completely free and doesn't even have ads

If you know how to send a text message, you can get similar information for free.

I'm going to change your life and let you see it.

Press 46645 to text "Google"

To save money, don't type the last 'e'

For example, when looking for a drug store near Chicago

Type "pharmacy chicago" or zip code

Within 5 seconds of sending a letter, you will receive a reply with the names, addresses and phone numbers of two nearby drugstores.

like this

And because it's already filled out, you don't have to go "uh, uh," while driving.

You can check the weather as well.

Type "weather" and the name of the city you're going to

Within 5 seconds, it will respond with the weather forecast for that city.

I will briefly tell you why I was in Milan.

this is just the beginning

These will come back to you in a text message that you can send to Google.

I have my email address so I can ask too.

This is really cool. The only downside is that you have to know how to send a text message, which no one over the age of 40 knows.

So let me show you how to do it better.

It's called Google Info

I launched an audio version.

voice recognition like you've never heard of it

What would you want if I were in Monterey?

let's bagel

Google: Please state your business and city/state

David: Bagel, Monterey, California

It's a Chinese line

(laughs) Google: Bagels, Monterey, California

The 8 main results are: 1st bagel bakery on Eldorado Street

If you like the first one, press 1 or say "first one"

Second: The Bagel Bakery of the Military Provisions Department

Second, second, two, two

(laughs) Why am I asking you?

Anyway... Oh! that!

Google: The Army Food Department is on McClellan Avenue in Monterey.

Would you like to connect please say "details" or "again"

David: Connected! Won't even give me my phone number

It's directly connected. It's like having a private follower.

Google: please wait

(laughs) David: Could I have 400 creamed bagels, please?

No, no, you're joking

I didn't even have to look up the phone number

it's amazing

and incredibly accurate

This is even better Set this as a speed dial

Any question can be asked by voice

Who won the 1958 World Series?

How to make a certain cocktail?

It's really cool, the answer comes back in text format.

I tried this morning to see if it still works

"Who played James Bond?"

The text comes back: "Sean Connery, George Lazenby, Roger Moore, Timothy Dalton, Pierce Brosnan, Daniel Craig."

Now let's pretend I was a Barry Girl

(in a distinctive way) "What is the word for when the sun, moon and earth are all aligned?"

Let's see how we are recognized

I have returned the text. "It's called a syzygy"

I remember those words when I won the Ohio spelling competition in 1976.

A lot of people are going to ask, "How in the hell am I making money off of this?" The answer is: look at the last line.

There is a small advertisement of about 10 characters

"What's going on? Why are you doing so well?

There are many people who say, "There are humans over there, right?"

There are humans!

We're hiring 10,000 people who get paid 20 cents per answer.

As you can imagine, they're college students and old people.

I have time

It's using humans, and it frees me from tough questions like, "When is the last flight out of Chicago?"

you know it's amazing

This is the biggest frustration I've ever had with any technology, but the other thing that bothers me the most about cellphones these days is

When I tried to leave a voicemail, I was asked to explain Ambien (sleeping pills) for 15 seconds by a 3rd grade teacher!

(Laughs) "To call this person..." What do you mean by "call"? What is 1975?

nobody has a pager anymore

"Start speaking when the tone rings

Please hang up when you have finished your message." Stop!

(Laughter) It's even worse.

To get the message..." What else is the reason I'm calling you?

(Laughs) Of course I want to hear the message!

(laughs) Oh! everyone has a cell phone

Last year, I went to Milan, Italy, and spoke to cell phone executives from 200 countries around the world.

So I jokingly said, "I did the math, and Verizon has 70 million customers.

If you check your answering machine twice a day, that's a billion dollars a year.

You're only doing this to increase our airtime, aren't you? ”

There was no laughter. (Laughter) Everyone was furious.

(Laughter) Sorry, I'm not a sharp tongue.

(Laughter) I'm going to tell you guys how to get out of this.

There is a service that converts answering machines into text format.

It will be sent to your cell phone by email or text message.

transform your life

By the way, I use a phone, so it's not always a perfect conversion.

So at the end of the email, the audio file is attached, so you can double-check.

This service is called Spinvox or Phonetag. This is what I use and it's called Callwave.

I definitely don't want my messages to be tapped."

Executives from these companies have told me, "We use the best peer-to-peer communication solutions in patent B2B..."

So I guess it's like an Indian with a headset eavesdropping.

I think this way because the first time I used a service like this, I got two voicemail messages, one from a man named Michael Stevenson, and it's not difficult, but he made a spelling mistake.

The other was from Vijay Singh, a Times video editor, and there was an "h" that he didn't read.

(Laughter) I'll let you decide.

(Laughter) Anyway, this service called Callwave is all software, and I promise that no one is listening to my answering machine.

I also promise to transcribe just the main points of your answering machine.

(Laughter) So I wanted to see how it worked.

this is what i tried

(Video): Hello, it's Michael.

How are you? I won't change

I took a walk down the street and the sky was blue

My daughter broke her leg at soccer practice.

i'm going to eat a sandwich for lunch

She's in emergency room 53W

I'll talk to you later See you later

(Laughter) I love my job.

(Laughter) A few minutes later, I got an email.

It's well texted, but a few more minutes later, I also got a text message. And remember, text messages are limited to 160 characters.

It's important to be the gist of the gist

I'm not kidding. The message said, "I took a walk down the street," "The sky was blue," and "Urgent!"

(laughs) f・・・

(Laughter) I think that was probably the point.

(Laughter) Finally, I can't help but talk about this.

One of my favorites is called PopularityDialer.com.

Let's say you have a date you don't want to go to, or a meeting that looks like it's going to end badly.

And then you go to this site, you put in your phone number, and they call you when you want them to. (Laughter) And at that time, the phone rings.

Then you can say, "Sorry, I have to answer the phone."

You know, the cool thing about this is that the person sitting next to you can hear you on the phone, etc.

So you can choose the content of the call.

is a girlfriend

Phone: Hey, what's up?

David: I'm talking

Phone: okay

David: What are you doing?

Phone: I was just wondering what you were doing

David: Okay, but I can't talk right now.

This is my favorite call from my boss.

Phone: Hi Johnson, I'm calling from the company.

David: Hello

Phone: Have you finished what I asked you to do a month ago? Copier training?

David: sorry i forgot

Phone: Okay, so when was the last time you used the photocopier?

David: 3 weeks ago

TELEPHONE: Whether you heard it or not, Lenny may have told you... (Laughter) I think the biggest change in the convergence of the internet and the phone is with the iPhone.

Not the best moment in my reporting career at the New York Times.

In the fall of 2006, I was explaining why Apple wasn't getting into the mobile business.

(Laughter) That must have seemed silly, but my logic was correct. I don't know if you realized that until the iPhone came out, Verizon, AT&T, Cingular, and other cell phone companies had veto power over every aspect of cell phone design.

I know people who worked at Treo

They went to their cell phone company and said, "Look at this cool feature," and Verizon said, "Oh no.

I don't think it's good

This hindered innovation

I didn't expect Steve Jobs to go around saying, "If you just let me design this cell phone, I'll give you exclusive rights for five years, so you don't even have to see it finished."

In fact, Verizon and other companies refused

Finally Cingular allowed

Talk about the impact of the iPhone

Please don't question me at the party tonight.

of course i am not

You know what I mean, the iPhone is a flawed masterpiece.

There are good sides and bad sides, let's all admit

But the iPhone changed a few things, first of all, it saw cell phone companies sell 10 million units a year.

They were like, 'Oh my God, we were wrong.

I should have left the mobile phone design to the designers," he said.

(Applause) It's also the first time that 10 million people have experienced being online at any given time.

Don't use a wireless card for your laptop that costs $60 a month.

I don't understand why we haven't reached that stage yet.

When I'm older, I'd like to say to my grandchildren, "When I was your age, if I wanted to check my email, I would drive around town looking for a coffee shop."

(Laughter) "A wireless base station could transmit radio waves within a range of roughly 45 meters."

(Laughter) It's funny, because every room in every building has an outlet, and it has running water.

What's wrong?

Anyway, this tells people what this is all about.

Go to YouTube and search for "iPhone shuffle"

You can watch a video of a 2.5 cm square model that looks like a real iPod Shuffle

"There is only one button

Touch to make a random call."

(laughs) "Who the hell are you?"

(Laughter) We also realized the idea of ​​the App Store.

Download directly to your iPhone

In this game, you will use the tilt sensor to drive.

It works with all parts of the iPhone, including the touchscreen.

This is a drawing program that is also the theme of EG 2008.

do you know how to turn it off?

Shake

Shake like this and it will disappear

There are 10,000 programs like this.

It's a translation program with every language in the world

Enter the word you want to translate and it will be translated

It's amazing, this is Midomi

Sing a song like tu tu tu, tattaratatatter, tan...

Hit "Done" and it will find the song and play it for you.

Incredible, right?

This is Pandora, a free Internet radio station, but it's not just a free Internet radio station, you just type in the name of the band or the name of the song.

I'll play the song right away

It has a thumbs up mark and a thumbs down mark

You can indicate whether you like a song or not

If he likes it, he recommends a song by another band that uses the same instruments or has the same vocal theme and tempo.

If you like it, or if you don't like it, click the thumbs up mark, the thumbs down mark.

Only the songs you like will be played.

It's called an urban spoon, and when you're in town, GPS pinpoints your current location.

Shake if you want to find a restaurant

Then you will see the restaurant

Price, location, rating will appear

Video: I Don't Want To Go To Flushing

anyway it's awesome

Of course, it's not just about the iPhone.

iPhone broke obstacles and walls

But now so are others. Google is developing its own Android operating system, which will soon be in 34 phones.

touch screen is very good

Android also has an app store where you can download apps

Influenced by all of this, Verizon, the calcified, conservative, and most inflexible of the cell phone companies, announced, "You can use any cell phone on our network."

I love Wired's headline 'No way that Verizon freed his line No it's real'

Everything is changing, and we're reaching a new world of innovation where mobile phones can replace laptops and become highly customizable.

All cell phones are proprietary, and you can add software.

Can I speak for another minute? thank you

(Applause) And finally, Apple's new power music stand.

It's only 1.3 kg, but with Microsoft Office installed it's 5.4 kg.

(Laughter) It was a terrible joke.

This is the song I posted as a music video on the New York Times website.

Guys, this was the best thing on Youtube for seven hours, it was bliss.

(To the song "My Way") Now the end is near

I'm tired of my old phone

Poor sound quality, weak signal, terrible software

made in hell

I heard there's a new product that's far better than my phone.

I'm in a cult too

i want an iphone

I'm a little uneasy It seems like I have a little flaw Let's face it

No keyboard, no memory card, I can't open it, so I can't replace the battery

but god this is great

Multitouch, iPod, Wi-Fi phone

captivated me

i want an iphone

I want to touch that precious screen

i want to wipe off my fingerprints

I want to show off to my friends

I want to say, "Look, it's cool, isn't it?" I want to line up and get it

i want an iphone

Why were you born a man?

If it wasn't an iPhone, what he got is junk?

It is the ideal image of the mobile phone itself.

Who cares if it's AT&amp;T?

I insisted and paid $500!

and bought an iPhone

(Thank you for applause

(applause)

Well... we're in the middle of a real war right now, a battle that we're losing.

It's a war against super-resistant bacteria

You may be wondering why, when I'm talking about super-resistant bacteria, I'm going to show you a picture of football fans, a picture from 10 years ago of Liverpool fans celebrating their victory over Istanbul.

That's me in the back in the red shirt, and next to me in the red hat is my friend Paul Rice.

A couple of years after this picture was taken, Paul was hospitalized for some minor surgery and died of an infection associated with a super-resistant bacteria.

i was totally shocked

he was a healthy man in the prime of life

Right on the spot, I received a lot of encouragement from a couple of TED folks, and I declared my own private declaration of war on super-resistant bacteria.

So let's talk a little bit about super-resistant bacteria.

This started in the 1940s with the widespread introduction of antibiotics.

Since then, drug-resistant bacteria have continued to emerge, forcing us to develop more and more new drugs to combat these bacteria.

And this vicious cycle eventually led to super-resistant bacteria, which are bacteria for which there are no effective drugs.

I'm sure you all know at least some of these super-resistant strains.

These are the more common ones that exist today.

About 700,000 people died last year from diseases linked to super-resistant bacteria.

Looking ahead, if we continue with our essentially drug-based approach to the problem, the best estimate is that by the middle of this century, 10 million people worldwide will have died from resistant bacteria.

10 million people

That's more than the number of people who died from cancer worldwide last year in the overall cause of death.

The road we're on is horrendous, and it's pretty clear that drug-based approaches to this problem aren't working.

I'm a physicist, and I'd like to see a physics approach to this problem, a different approach.

In this context, the first thing we know for sure is that we know how to actually kill all kinds of microbes, viruses and bacteria.

It's a method that uses UV light.

In fact, we've known this for over 100 years.

Everyone knows what ultraviolet light is.

Ultraviolet is the short-wave portion of the light spectrum that includes infrared and visible light.

What's important, from our point of view, is that UV light kills bacteria by a completely different mechanism than drugs kill bacteria.

UV light can kill drug-resistant bacteria just like any other bacteria. UV light is so good at killing all germs that it's used a lot these days to disinfect rooms and work surfaces.

This is an operating room disinfected with germicidal ultraviolet light.

But in this photo you see right now, there are actually no people in it, and there's a very good reason for that.

UV rays are actually harmful to our health. They can damage the cells in our skin, causing skin cancer, and they can damage the cells in our eyes, causing eye diseases like cataracts.

That's why you can't use conventional germicidal UV light when there are people around.

But of course, most of the time, you want to disinfect when people are around.

So the ideal UV light should be able to kill all bacteria, including super-resistant bacteria, and be safe for humans to be exposed to.

With my background as a physicist, I'm coming into the story.

Together with my physicist colleagues, we realized that certain wavelengths of ultraviolet light would kill all bacteria and should be safe for humans.

That wavelength is called far ultraviolet (UV-C), and it's the short-wave portion of the ultraviolet spectrum.

let's see how it works

So what you see here is the surface of the skin, with bacteria suspended in the air above the skin.

Let's see what happens when we hit conventional germicidal UV light.

As you can see, germicidal UV light is very good at killing bacteria, but as you can see, it can penetrate the upper layers of the skin and damage vital skin cells, which can eventually lead to skin cancer.

Now let's compare it to far UV, the same situation, with bacteria in the air above the skin.

As you can see, once again, the far UV kills the bacteria perfectly well, but the far UV cannot penetrate into the skin.

There's a pretty solid physical basis for that: Far UV is so strongly absorbed by all living matter that it simply doesn't travel very far.

Now, viruses and bacteria are very tiny things, and far UV rays can certainly penetrate and kill them, but they can't penetrate the skin, not even the dead cell layer at the surface of the skin.

In this way, far UV radiation can safely kill bacteria.

this is the theory

it should work and be safe

What about actually?

Will it really work?

Is it really safe?

That's what we've been working on in our lab for the past five or six years, and I'm happy to say a big yes to both questions.

yes it works and it's safe

I'm happy to say that, but I think it's fair to say so, because it's purely based on the laws of physics.

let's look to the future

We now have a completely new weapon, and we're thrilled that it's a cheap weapon in the fight against super-resistant bacteria.

For example, far ultraviolet light is in the operating room.

Also installed in the kitchen

In terms of stopping the spread of viruses, far-UVCs are being installed in schools to prevent the spread of influenza and measles, and far-UVCs are being installed in airports and airplanes to prevent the global spread of things like the H1N1 virus.

Let's get back to my friend Paul Rice.

He was a well-known and well-loved politician in our hometown of Liverpool, and a statue was erected in the heart of Liverpool to commemorate him.

But I want Paul's legacy to be a major step forward in the fight against super-resistant bacteria.

If we protect it with the power of light, it's really within our reach.

thank you

(Applause) Chris: Hold on, David, I have a question.

(Applause) David: How far along are you in development, and what are the remaining obstacles to getting this out there and realizing your dream?

David: We all know that this will kill any bacteria, and we knew that before we started.

We really have to do a lot of testing on safety, testing on safety rather than testing on efficacy.

Both short-term testing and long-term testing are needed to make sure it doesn't turn into melanoma over the years.

So far, these studies are doing pretty well.

Of course, it is necessary to deal with the FDA, but that is a matter of course, because without FDA approval, it cannot be used in real life.

Chris: Are you planning to start in America first? Or some other country?

David: A few countries-

in Japan and America

Chris: Have you convinced biologists and doctors that this is a safe procedure?

David: Well, as you can imagine, there is some skepticism, but everyone knows that UV light is not safe.

So for someone to come up here and say, "This particular UV light is safe," I need some evidence, but I have the data, and I'm trying to make that claim.

Chris: I hope it goes well

This is potentially very important.

Thank you very much for talking to everyone

thanks david

(applause)

Hello

I'm Herman, and I'm always amazed that a tsunami of change to our culture and society can come from something we thought was silly.

I'm a computer scientist, and I remember Facebook being just a dorm photo-sharing site, and opinions vary, but it's now turned elections upside down.

I remember that cryptocurrencies and automated trading were viewed by a small group of misfits. Automated trading for financial institutions and cryptocurrencies for online payments were seen as a disappointment.

I'm sure you all remember those moments when you thought it was such a boring idea that you could ignore it, and then suddenly, wow, bitcoin is priced like this.

Wow, that kind of thing will be elected

In my view, we're about to face that again.

There are some very high impact changes coming that will change the way we live, the way we are educated, the way we earn money. The change is not coming from AI, or space travel, or biotechnology.

that's a bold claim

Some people look suspicious

If you look at what games are already in our lives today, and what technological advances are creating, it seems inevitable.

I see an electrifying possibility there.

Think about scale

There are already 2.6 billion people who play games.

1 billion more people in the last 5 years

It's grown so much in such a short time.

No religion, no media, has ever spread so quickly.

If we had the infrastructure to play games in Africa and India, there would be another billion people.

And here's the interesting thing -- and it surprises a lot of people -- the average age of gamers. How old do you think they are?

I'm not 6, I'm not 18, I'm not 12

I'm 34 years old

[Average age of American gamers is 34] Older than me

Games are no longer play for children.

It's become a medium that is as fundamental a part of our lives as literature or whatever.

My favorite statistic is that most people who started playing games in the last 15-20 years have continued to do so.

Something has changed in the way games are a medium.

And there's also the fact that it's no longer just a game.

As I said before, there are people who earn money by playing games.

not in an obvious way

Of course, there are e-sports, and there are ways to participate in competitions and earn prize money.

On the other hand, there are people who make money by modding games and creating content and creations within games.

Something like the Italian Renaissance is happening in a big way in your child's iPhone and in your living room.

not getting attention

What I'm more excited about is what's about to happen.

When you think of a game, you might think of a big, endless world, but the truth is that for a long time, games were very limited, and developers just managed to keep it out of sight.

If you'll forgive me for being a geek, I think the theater would be a good metaphor.

Games have come a long way in the last 10 years, in terms of visual effects, physical immersion, aesthetics.

But behind the scenes, the experience of the game world remained severely limited.

I'll talk to you about that soon.

Suppose you step out of the theater and scribble something or get into a fight or fall in love—

I may do it all after this, but whatever I do has consequences.

It spreads like a ripple in reality, and everyone can be involved in it at the same time.

it lasts

And this is an important aspect of what makes the real world real.

On the other hand, behind the scenes of the game, there have long been strong restrictions.

The actual information exchanged between players and virtual beings within a single game world is very limited, and this is because the game mostly runs on a single server.

Even "World of Warcraft" is actually a collection of thousands of tiny worlds.

Even a "Fortnite" concert is actually thousands of little concerts.

It's like the campfire we talked about earlier and the sofa.

It's impossible to put it all together

I will explain so that you can understand what I mean

When you think of a game, there are beautiful images like this, and various things unfold in front of you.

But under the hood, online gaming is like this.

In the eyes of a computer scientist, there is little information exchanged between a handful of entities or objects.

You might have thought you were playing in an endless world,

it's more like a treadmill

As the player walks around the world, the place they left disappears and the place they moved to appears, which is a neat trick.

It's not the basis for the revolution I mentioned at the beginning of this story.

But now, whether you love games and are excited about them or are intimidated by them and shy away from them, everything is about to change.

because it has finally come true

I've been betting on this for a long time, and there are a lot of people working on this problem, and it's never my credit, but it's finally possible to knit thousands of different computers into one simulation, which is very difficult, and it's not a one-time thing, and anyone can do it.

And we've reached a point where we can begin to experience things we don't yet understand.

let's visualize

It's not just individual little simulations, but the grand possibilities of a huge network of interactions.

You can do big global events there.

It's the sort of thing that would be difficult to do in real life at that scale.

I'm sure some of you play games, so let's take a look at some footage from games made by our partners.

TED and I communicated with each other, and we should have gotten permission.

It's a new experience created by this technology that not many people have seen before.

I'm going to take a moment to show you a few, where thousands of people are simultaneously participating and fighting in one game world.

We also have our own ecosystem here, with our own unique predators and prey.

everything is running in simulation

This is a game by Chinese giant NetEase.

There's a permanent, creative simulation that people on different devices can create together, a world that doesn't disappear when the game is over.

A place to tell stories and adventures

Even the weather is simulated

very cool

this is my personal favorite

It's by a pioneering team from Berlin called Klang Games, and it's just crazy.

They found a way to model the entire planet.

A simulation involving millions of non-player characters and players.

We're enlisting the help of Lawrence Lessig to understand the impact of politics on the world we're building.

Amazing experiences that were previously unimaginable are now becoming possible, and that's just the first step in this technology.

What will happen if you go there?

In computer science, once a difficult problem is solved, there is an explosion of progress.

The time will soon come when this type of computing power will become trivial.

When that happens, the possibility of—

I want you to imagine what I'm talking about

Hundreds of thousands, millions of people will be able to live together in one place.

It's been a long time since there was an opportunity for so many people to do or create something together.

It wasn't a very good situation either.

war or building pyramids

It's not a very good way for people to spend their time.

But what kind of shared experience is created when you bring so many people together?

You will be able to train your social skills that have become dull.

Think about what that means for relationships and identities.

If we could give people a multitude of great experiences and worlds in which to spend meaningful time, the meaning of the individual would change.

You can go beyond a single identity and have multiple identities.

No matter what gender or race or personality you were born with, you might want to try something different.

you may want to be more than one person

We are all multiple beings inside.

It's just that I don't have many chances to get it out.

It's also a matter of empathy

I have nothing in common with my grandmother.

I love my grandmother very much, but her story starts in the 1940s and ends somewhere in the 1950s.

What I know is half a century later.

But if we can share our lives and our experiences and create opportunities together, regardless of our physical weaknesses or our lack of a common background, that will change things and bring people together in a different way.

It's amazing how social media can amplify our differences and make us who we are in the midst of others.

Games allow us to reconnect and give us the opportunity to share adversity and opportunity.

i think you will give me

Even at this very moment, statistically, people on the other side of the conflict are being matched in a game and are playing together without even realizing it.

This is a great opportunity to change the way we see things.

And some people look at these things with a cold eye, and some people don't like virtual worlds, games, things like that.

There's a reality that we have to accept. The economic impact of what I'm talking about is going to be substantial, and there are thousands of people who make games their business right now.

soon there will be millions

With a smartphone, you can work

It's a creative, rich income opportunity, no matter what country you're in, no matter what skills or opportunities you think you have.

The first time a child gets money at work will be in a game.

Early in life, new age newspaper delivery, new income opportunities.

Lastly, rather than giving my thoughts, I would like to make a request.

This new opportunity requires a different response than past opportunities.

And yet again, it might seem silly to have techies stand on stage and say, "The future is great, and technology will solve our problems."

Of course, reality has its downsides as well.

But sarcasm and derision about the opportunities that this presents only reinforces the negative side.

The worst thing we can do is to let four or five familiar companies control the world of games.

(Applause) Because they're not just deciding who makes money from it and how.

It's about determining how we think, what are the rules of identity and collaboration, what are the rules of the world we live in.

This is what we should own and create together.

I would like to ask the engineers, the scientists, the artists listening to this story.

You may dream of working in space travel.

The world you can create is here now, and it will change people's lives.

There are still vast technological frontiers to overcome that we faced when building the early Internet.

The technology behind virtual worlds is all different

So I would like to ask

Again, I'd like to ask you all to join us in shaping this in a way that we like, rather than making it something that we can push.

thank you

(applause)

The King and Queen of Haiti were met with thunderous applause at their coronation.

After receiving the ornamental crown and scepter, Henri Christophe ascended to the 20-meter-high throne.

But the cheering crowd had no idea that he would be the first and last king of Haiti.

Born into slavery on the island of Grenada, Christoph spent his childhood wandering around the Caribbean islands.

In 1779, when he was just 12, he accompanied his employer to aid American revolutionaries in the Siege of Savannah.

The long siege would be Christophe's first experience of violent revolution.

Little is known about his life immediately after the war Little is known about his life immediately after the war

For the next decade, we know he worked as a stonemason and a hotel waiter in Saint-Domingue, a French colony in what is now Haiti.

When the colonial slaves rioted in 1791, Christophe got another chance to fight for his freedom.

Led by Toussaint Louverture, the rebels fought against planters and British and Spanish forces seeking control of the island.

Christophe climbed through the ranks, proving that he was just as capable as an experienced general.

By 1793, Louverture had liberated all of Saint-Domingue's slaves, and by 1801 it had established itself as a colonial, semi-autonomous island nation.

But in the meantime, Napoleon Bonaparte had come to power in France with a mission to restore slavery and French powers throughout the empire.

France's attempt to restore slavery met with fierce resistance, to the point that General Christophe set fire to the capital to prevent a military occupation.

Ultimately, mutiny and an outbreak of yellow fever forced the French to retreat, but the battle was not without casualties.

Louverture was captured and died in prison in France, and Christophe's nine-year-old son met the same fate just a few years later.

Following the revolution, Christophe, General Jean-Jacques Dessalines and Alexandre Pétion rose to key positions in the new government.

In 1804 Dessalines was proclaimed emperor of independent Haiti.

But his ambitions for exclusive power alienated his supporters.

Dessalines' rule eventually fueled political conspiracy theories, leading to his assassination in 1806.

The ensuing power struggle culminated in a civil war that split the country in half.

By 1807, Christophe ruled in Cap-Haitien as president of northern Haiti, and Pétion ruled south from Port-au-Prince.

Péchon tried to stay true to the original spirit of the civil revolution and wanted to build a republic modeled after the United States.

He also supported revolutionaries in other countries against colonial rule.

These policies were supported by the public, but they lagged trade and economic growth.

Christophe, on the other hand, had more ambitious plans for an independent Haiti.

It redistributed land among its citizens while maintaining state control over agriculture.

He established trade with many foreign countries, including Great Britain and the United States, but promised not to interfere in foreign policy.

He built a huge "citadel" (fort) in case of a French reinvasion.

To accomplish all of this, Christophe enacted labor obligations and ascended the throne in 1811 to consolidate his powers.

During his reign, he lived with his wife and three remaining children in an elegant palace called the Sanssouci Palace.

Christoph's kingdom advanced trade, industry and cultural education under supervision Christoph's kingdom advanced trade, industry and cultural education under supervision

With a Haitian cultural background, he invited well-known European artists and European teachers to help shape public education.

But while the king was popular with his people at first, his obligation to work brought back haunting memories of the time when Haitians once rebelled against slavery.

Over time, support for his escalating authoritarian policies waned, and hostile forces in response to the South grew stronger.

His reign finally came to a tragic end in October 1820.

Weakened by a stroke, after a few months of difficulty in governing, key members of the army defected to the forces of the South.

The betrayed and discouraged king committed suicide

The scars of Christophe's complex history are still visible today in the ruins of crumbling palaces and the legacy of Haiti, the first nation to permanently abolish slavery.

The first time I defined success in my own way was in 1934, when I was teaching at a high school in Indiana.

I was hoping for a neighbor to get a C, but... all the neighbors are average.

However, in the case of his own child, he was dissatisfied, and rather said that it was the teacher who was at fault.

This is wrong God the Almighty Father

Human form, appearance, even intelligence weren't created equal.

I don't like this kind of evaluation where everyone can get an A or a B. I don't know how alumni and school officials evaluated coaches and teams in the '30s.

If all wins, well, it seems to be a "success", but that wasn't always the case because

We went undefeated for years at UCLA

Except when I won by a narrow margin, they read the results, and sometimes I (Laughter) I wondered if there was a more pragmatic backing to those readings.

In the 30's it was normal and understandable

i didn't agree

I wanted something that I could become a good teacher and be admired by my students.Besides my grades in physical education and English classes, I wanted something that I could set goals for.

I thought about it for a while and made up my own definition

I knew Webster's definition, but the accumulation of material possessions, the power and the prestige, of course, are valuable things, but they don't always lead me to success.

So I needed my own definition

Growing up on a small farm in Southern Indiana, my father taught me and my brothers, "Don't try to be better than others."

My father certainly said so, but I forgot all along and was remembered later

Never be above others Always learn from others and never give up

Aim for Your Best--With Your Own Power

If you become obsessed with things that you can't do on your own, or if you worry about it, it will even affect your self-worth.

Then I came across a story that said, "I was beaten to my knees before God, 'I'm a loser.'

God admonished the man who lamented, 'Your best is success'."

All these things combined, I've come up with my definition of success, which is that people are self-fulfilling when they do the best they can within their capabilities.

it's true if you try

Try to improve yourself as hard as you can This is success Success that no one can criticize Personality and reputation follow us Reputation is who we should be Personality is who we really are

"Personality" is much more meaningful than what "should" be, rather than appearance

Of course you want both to be good, but not both are the same.

Yes this is what I want to share with young people

there are other things i like to teach

As the person just said, I have a hobby of poetry.

Give me a helping hand To be better I know it's not the way it should be

I'm definitely better than I was before I might have been a lot different if I hadn't encountered poetry

There is a poem that says, "Young people never learn from words on paper, or excuses that come out of your mouth, or books on the shelves, because young people are looking at their teachers' backs."

It was shocking to me in the 1930's.

I decided to put it into practice in the classroom, both in physical education and in English class.

i always liked poetry

Maybe it's because my father told me to light the lamp--because there was no electricity at the farm house

my father read me a poem

So I met line after line in the poem One day someone became a female teacher

I asked her why she became a teacher, she gave it some thought

And she said, "When they asked me why I became a teacher, I said, 'You don't have any other great friends like this, do you?'

And there's a doctor by his side, with his competent hands repairing the bones and the bloodstream.

A carpenter builds a church, where a pastor speaks the word of God and leads the lost to God.

They are all teachers, farmers, merchants and workers, all working, fighting, building, thinking and praying for a better tomorrow.

I may never see the Society in its entirety, I may never hear its words, nor its food, but I say it again and again, I know them, weak and strong, brave, proud and carefree.

children i know

I was asked why I became a teacher. ’” Teaching Jobs Face Young People Among UCLA students are more than 30 lawyers, 11 dentists and doctors, many teachers, and others who have taken other jobs.

Watching them grow is such a joy

I always told my students that getting an education comes first, basketball comes second, and you gain the strength to live.

I wanted my students to understand this idea.

i have 3 rules

Things I learned before coming to UCLA I've always treasured

The first is-- never, never be late.

I always told my players that when you go on a trip, always dress properly.

One time I made him wear a jacket, a shirt and a tie

The headmaster came in jeans and a turtleneck, and I realized that I went a little overboard, but-- at least I said it properly.

Bill Walton on my team

There was a famous player, and one time he almost missed the bus, and it was time to go on a road trip.

I didn't put him on the bus because he wasn't neat.

He couldn't get on, so he went home, changed clothes, and headed to the airport.

I'm stubborn in my beliefs

time is very important

You should be punctual, e.g. practice starts and ends on time

So you don't have to worry about lingering

At coach training school, I often say, especially young coaches -- but there are more and more young coaches these days.

Most young coaches are newlyweds

So you say, "Don't extend practice. You'll go home frustrated. Going home frustrated is especially bad for newlyweds."

Well, as you get older, it doesn't matter as much... (Laughter) Time is important.

the end time

Number two-- don't use foul language

If you yell even a single word, you'll be banished for a day.

If it's in the middle of a game, I'll leave immediately and just sit on the bench.

Third - don't criticize your teammates

Anyway, I didn't like it. In my case, I got paid to criticize my students.

Because that's the job, it was underpaid, but I'm getting paid

It wasn't as well paid as coaches these days

It was a little different back then

These are the three things that have always been important to me

This was actually taught to me by my father

what my father taught us brothers

I came up with this kind of pyramid a long time later, and I won't go into details, but it was my salvation as an aspiring teacher.

Well, the pyramid is a stack of individual blocks, built on hard work and dedication, working hard and having fun to get to the top, according to my definition of success.

And at the top is honesty and perseverance

So no matter what you do, you have to be patient. Patience is

Lead me to success It's hard when you're young

We want change quickly because we tend to think change is progress

When it gets a little older, let things go

You stop thinking that change is progress, so you have to be patient

then be honest

The important thing is to believe, really believe, not just on the lips

Believe that everything will be fine From there you will see what to do

In many cases, it's easy to think that things will turn out the way you think they should, and yet you tend to avoid what you really need to do.

I thought about this for 14 years, and it ended up helping me become a better teacher.

But in the end, back to the definition of success.

A long time ago, there was a referee in the MLB named George Moriarty.

Moriarty's spelling is i

I've never seen a spell like that

Basketball players in the big leagues were sensitive to such things and realized that Moriarty had one i.

Amazingly, many people said he had one more than he had in his head.

(Laughter) But when I was practicing the pyramids, he wrote exactly what I thought, "The road ahead and

Entitled "The Road Behind"

"Sometimes, even if the goddess of fate blames fate for her defeat, she has to smile, even if the existence of the goddess of fate is suspected.

I used to say that I don't care if I win or lose, the trophy that shines above my head

Won't bring tomorrow's victory

I know it well, there's always a chance to win

But if I couldn't give it my all, I just didn't get the chance to put all my heart and soul into it for victory, the chance to show my guts, the chance to keep going even if others quit, the chance to keep going until I'm satisfied.

Do your best until you win - go for the goal

I pray that my dreams will be shattered, I pray that my hopes will die But I will lose, I'm not afraid of falling If I have the courage to throw everything away, I can hold my own

those who seek more

Victory is not far away if you give everything

That's why fate sometimes makes mistakes, no matter how much you try

Fate is in your hands and mine--we are the ones who open and close the door to the road before us."

Remind me of what my father taught us Don't complain Don't complain Don't make excuses

Whatever you're doing, get out, do what you can

because no one can do more

I don't think anyone noticed, but I never said "victory."

don't say "victory"

You can lose a match even if you score more points than your opponent, and you can win even if your score is low.

On various occasions, there were scenes that made me think so

I wanted the players to look up after the game.

I always used to say, "Even if the game is over and you meet people who don't know the result, it doesn't matter who scores the most points so that they don't know the result from the look on their faces.

This is really important, if you put in as much effort as you can, the results will come naturally."

not what i want to be but what i should be and can i be

i was hoping for just that

As time went on, I noticed something else, the results were getting better and better.

It's just a by-product, not the true result.

I believe that a certain philosopher, oh yes, Cervantes

Said "The journey is better than the destination"

i like this

The road to get there I'm often disappointed when I arrive

But it's a fun way to get there

When I was coaching at UCLA, I was at my best when I was practicing. When the game comes, it's over, it's just the end result.

Just sit in the stands and watch the players play That's how I know what it's been like to work that week

That's why the players feel self-satisfaction and the effort they've put in up to that point also seeps out.

Sometimes the players asked me who was the best

i couldn't answer

When you think about each individual, one day someone said, "What if the best player?

What kind of player would you choose? "

So I said, 'Who knows why I'm at UCLA?

But I want him to be a good player at the same time.

Think Defenders Win Championships

But it doesn't have to be aggressive

You can't be selfish. It's more important to connect than to shoot.

What can and does pass

(laughs) Some people can do it, but some people can't.

Being able to shoot from outside the zone

And from inside the zone (laughs)

I have to be good at rebounding

Players like Keith Wilkis

He was a great player, but he's not the only one.

I admired him because he tried to be number one.

In my book, Called Coach, I gave you two great players, the best I know, Konrad Bürke and Dog McLutsh.

When I was in the first grade, in my new team, there weren't any first-year students who were good at that time--

I said, "If one of these two wasn't born the same age," I said, "If this player made the school varsity team, that team would be in trouble."

As you know, one of them became a starting member

Already alone will participate in the next one National champion for 32 minutes It was really amazing Next year I will be a starting member

The national champion team, but he didn't play one minute of our game, so I was really happy and satisfied.

Neither shot well

But the probability of shooting was high because I didn't push myself too hard.

They didn't jump well, but they always held a good position, so they rebounded well.

I thought every shot would miss

Everyone around me was waiting for me to come off Then I moved too late There are already other players standing in my way

I wasn't quick, but I was always in a good position, good balance.

So the defense was always good

These two players always got as close to the position where they could perform as they could, more than anyone else.

So to me, they're like Luis Alcinda and Bill Walton, just like any other great player.

Was it a rambling story?

Now that he's here, it's time to shut your mouth

(Laughter) (Applause)

Most people think of the AIDS outbreak in the 1980s.

Indeed, in that decade, we discovered AIDS and the virus that caused it, HIV.

But decades before that, it entered humans, from chimpanzees to hunters.

This photo is from Brazzaville, Congo, before the Great Depression.

I think thousands of people were already infected with HIV at this time.

I have a few critical questions here

If thousands of people were infected at this point, why did it take until 1984 to discover this virus?

Now, more importantly, if we existed in the 1940s and 1960s, if we had witnessed this disease and understood exactly what was going on, was there a way we could change the nature of the epidemic and make it something else entirely?

It's not just HIV, many viruses come from animals.

You can think of it as a pyramid of viruses that pass from animals to humans.

At its apex, it becomes a fully human virus.

It's at this level of the pyramid that we spend most of our energy, studying viruses that are perfectly adapted to humans and that are very difficult to understand.

For the last 15 years, I've spent the last 15 years researching early-stage transmission methods.

The idea is that we could deliberately throw a virus into human society, study its behavior, and capture the moment of infection, so that we might be able to detect the virus early.

Here's a picture of the scene

central african hunter

looks like a normal photo

One thing to watch out for is the profuse blood contact.

This is the crucial key, very direct contact.

If we're going to look at virus chatter, we need to look at residents who come into contact with wild animals.

We've been investigating people like this guy.

Collect blood and other specimens

Investigating animal diseases in addition to humans

This allows us to catch animal viruses at an early stage when they enter humans.

The basic goal of this study was not to conduct a one-time study, but to select thousands of subjects and observe them on a regular basis.

If you're sick, I'll take a sample.

It's ongoing, but we're working with you to collect animal specimens.

Hand over a small filter paper like this

When we sample animals, we take blood on filter paper, and we find unidentified viruses in the target animals, from animals that are actually being hunted.

(Video) Narrator: Two hunters stalk their prey in the remote mountains of Cameroon

Patrice and Patty

I'm looking for forest animals for meat for my family.

I go hunting in the woods near my house almost every day.

Set traps to catch pigs, snakes, monkeys, rats, etc.

I searched for hours this day, but there was no harvest.

there are no animals

stop to drink water

Then you can hear a rustling sound coming from the bush.

A hunter approaches it.It's full of game.

This monkey has at least three known viruses.

Nathan Wolfe: There are quite a few pathogens in this animal.

These hunters are at risk, especially if they have blood contact, and they are at risk of contracting the new virus.

Amazing facts come to light when you show off your prey

He shows me the filter paper from which the animal's blood was collected.

The blood is positive for the zoonotic virus, something he's been looking for for years.

This one belongs to the animal here, the big-nosed cercopithecus.

Every user of the filter paper has received a minimum of basic health education, an education about the risks of this research, which from our point of view will not only reduce the risk to ourselves, but it will significantly reduce the risk to our families, our villages, our countries, our world.

Before I go any further, let me tell you a little bit about meat. Meat is the prey of wild animals.

A variety of meats can be considered

let's talk about it

When our children and grandchildren ask us about this shelf life, one of the questions is: Why are our closest relatives, our most precious endangered species, extinct because we haven't addressed poverty in these regions?

But that's not the only question

I also ask questions like this: If HIV entered human society in this way, and knew of its potential for other diseases, why did you let it go?

didn't find a solution

I'm sure you'll say Precarious regions of the world are suffering from severe poverty, population growth, lack of sustainable resources, and food shortages in the current situation.

but you have another question

We all need to ask ourselves why do we think this hunter is to blame?

I am a hunter. You can see it over my right shoulder, the hunter who caught the monkey in the last photo I showed you.

look at the shirt

look at your face too

Meat is one of the greatest crises currently underway in human society on earth.

But like this it's not anyone's fault

It's not just one person's problem to solve

There's no easy solution, but we're putting ourselves at risk by leaving this problem alone.

In 1998, together with my mentor Don Burke and Colonel Mpoody N'Gori, I went to Central Africa to work with hunters to begin this research.

I was a postdoctoral fellow at the time and was tasked with preparing this study.

I vowed in my heart, "I'll collect all the specimens. I'll go anywhere. It's the best."

I picked 17 places on the map, and I thought it would be fine.

(Laughter) Of course you're totally wrong.

this is hard work

Luckily, my team has the best colleagues and collaborators, and that's what makes research possible.

This research has many difficulties.

One is to earn the trust of the hunters you work with.

The one on the right is Mr. Paul DeLonge-Minutu.

the best communicator

At the time, my French was zero, but I felt like I understood what I was saying.

Paul worked for many years on Cameroonian radio and television and was a well-informed advisor on health issues.

I figured if I hired him, he could act as a go-between when we got there.

But when you arrive in this rural village, there's no TV, so you can't see his face.

But when he started talking, I heard a voice on the radio.

He was someone who could have a message for us, whether it was wildlife conservation or health prevention.

And it's also subject to frequent roadblocks, and this is a 200-person trip back from the study site, straight to the lab in less than 48 hours.

Take a look at this, Oubold Tamufi, Chief Investigator in Cameroon.

I laugh when I show you this picture, because you can't see my face.

But the reason I'm showing you this is because he's trying to solve this problem.

(Laughter) I actually solved it. Really

Introducing past and present photos

Former laboratory

this is what it looks like now

I used to need dry ice to send samples, and I had to ask someone at the brewery to get it for me.

I'll bring liquid nitrogen now

The laboratory may be the coldest place in Central Africa

It's my photo. it's a previous photo

(laughs) No comment.

The current situation, after 10 years of research, is surprising.

made many discoveries

If you look in the right places, you can get a picture of how the virus gets in.

A very big light of hope

What we found was a new virus in the population, a new retrovirus, including members of the same group as HIV.

Let's face it, we should identify all new retroviruses in human society.

We are looking for it, no surprise

Of course, viruses that have invaded this rural area in the past may be extinct.

Not now. The road becomes the passageway to the city

And dangerously, the situation in Central Africa extends far beyond the region.

When we realized that we could monitor this virus, we decided to expand our research and establish a global surveillance system.

With generous support and scientific partnerships from Google and the Skoll Foundation, we have launched the Global Virus Prediction Program and have begun research in four locations in Africa and Asia.

Of course, the process of exposure to the virus is different for each inhabitant.

Not just Central African hunters

It's also found in wildlife markets, it's active in wetlands markets, and it originated in Asia.

But it's just the beginning of a research project.

Our goal at the moment is to staff it up, start research and get new collaborators, because we feel the need to expand our research to more than 20 hotbeds of viruses around the world. The idea is to cast a tremendously wide net, ideally to catch viruses, blood banks, sex lives, and prevent them from entering aircraft.

Not so long ago, there was a time when the discovery of unidentified creatures was awe-inspiring.

It means that we had the potential to change the way we see and think about ourselves.

Many people on the planet now despair and think that humans have discovered most of the phenomena.

never despair

If intelligent extraterrestrials were to compile an encyclopedia of life, 27 of the 30 volumes would be devoted to bacteria and viruses, and the remaining few would be plants, fungi, and animals.

Now is the most exciting time for the study of unidentified life on Earth.

Even if it is dominant on the ground, there are also unexplained life forms.

But we have a wonderful tool that allows us to explore and understand the unknown world.

Thank you for your attention

(applause)

Hundreds of thousands of people are currently waiting for organ transplants, and transplanting vital organs like kidneys, hearts and livers could potentially save their lives.

Unfortunately, there just aren't enough donor organs to meet the demand of people who want a transplant.

What if we could create new, customized organs without waiting for donors?

It was against this background that bioprinting was born, which is currently being developed as a field of regenerative medicine.

We're still a long way from being able to create complex organs, but we can already create simpler tissues such as blood vessels and tubular organs that exchange nutrients and waste products.

Bioprinting is an application of 3D printing that creates three-dimensional objects by layering materials layer by layer.

Instead of using metal, plastic, or ceramics, 3D printers that create organs use bioink, a printable material that contains living cells.

Most bioinks are mostly water-rich molecules, hydrogels.

It's mixed with millions of living cells and a variety of chemicals that help cells interact and grow.

Some bioinks contain a single cell, while others contain different types of cells to create more complex structures.

Let's say you print the meniscus, which is the part of the cartilage in the knee that keeps the shin bone and the femur from rubbing against each other.

The meniscus is made up of cells called chondrocytes, and bioink needs healthy chondrocytes.

These cells may be donated by donors and the cell lines replicated in the lab.

In some cases, the patient's own tissue is harvested to create a separate cartilage tissue that is less likely to be rejected.

There are multiple printing techniques, but one of the most popular is material extrusion, bioprinting.

It's a process where the printer's chamber is filled with bioink and the ink is forced through a round nozzle attached to the printhead.

The nozzles are usually less than 400 microns in diameter, and the ink flows through the nozzles and is ejected as a continuous filament about the thickness of a fingernail.

The intertwined strands of filaments are layered on a flat surface or in a liquid, based on computerized images and data. The liquid helps stabilize the structure in place.

In this way, thin strands are printed one at a time, and a meniscus can be produced in a matter of 30 minutes.

Some bioinks harden immediately after printing, while others require UV light or additional chemical or physical steps to stabilize the structure.

If the printing process is successful, the cells in the engineered tissue will begin to behave just like the cells in the real tissue, signaling each other, exchanging nutrients and proliferating.

We already have the technology to print relatively simple structures like the meniscus.

We've also successfully implanted bioprinted bladders, and in experiments with rats, we've also shown that the printed tissue accelerates facial nerve regeneration.

Researchers have so far created scaled-down versions of kidneys, livers, and hearts that are responsible for some of the lung tissue, skin, cartilage, and function.

But recreating the complex biochemical environment of major organs presents a high barrier.

In material extrusion bioprinting, if the nozzle is too small or the printing pressure is too high, it can destroy a significant percentage of the cells in the ink.

One of the toughest challenges is how to make a full-scale organ supply all the cells with oxygen and nutrients.

That's why the structures we've successfully recreated today are either flat or hollow, and researchers are now trying to find ways to incorporate blood vessels into printed tissue.

Bioprinting has so many possibilities, not only to save lives, but also to better understand how organs work in the first place.

The potential for bioprinting technology is immense, and we may even be able to print tissues with embedded electronic components.

Will we one day be able to enjoy organs beyond our current capabilities, skin that doesn't burn, and so on?

How much longer can humans live by printing and transplanting organs?

And just who and what could bring about this kind of technology and the amazing results?

The first thing I want to say is that cars are art.

In fact, this is very important to me, because car designers are sometimes thought of as an ancillary profession. We don't just deal with the surface of a car. A car is both a product and an idea, so it's hard to understand its aesthetic appeal in the language we use to talk about art.

And if cars can be as relatable as art, then we should treat them as art, and if cars are as relatable as art, then we should treat them as art.

See Michelangelo's work

It's completely different than a car.

Automobiles are “self-moving.” In that sense, elevators are “self-moving.”

It's not emotional, it's purposeful. It's been around 100 years since the automobile was invented.

We've created a lot of problems that need to be solved, like pollution and congestion, but that's not the point of today.

We're talking about the car itself.It's your tool, but in many ways, it's also us.

I think that if we solve all the problems with cars, like BMW is doing, with fuel cell and hydrogen technology, we can look back and understand why cars are so attractive to so many of us, what they mean, and what we can learn from them.

I want to touch on that. Your car is not your clothing. Your car is your avatar, an extended version of yourself, a device that expresses and amplifies your thoughts, ideas and emotions.

What's going on inside, if you care about sexiness, the car is sexy, and if the traffic annoys you, you'll drive a wild car.

Did you know that cars are sculptures?

All cars are hand sculpted

Many people think "Computer design, machine manufacture" Many people think "Computer design, machine manufacture"

Yes, mass production is done by machine, but the originals are all hand made.

It is in charge of craftsmen who are confident in their skills

They give the car the same subtle tension as a sculptural masterpiece in a museum.

There's a tension between expressing and discovering, adding new elements, and at the same time, the limits of craftsmanship.

Generally speaking, this is the surface view, the part that you can express intentionally, the part that shows you are a good craftsman.

That kind of discovery and tension creates something new, and at the same time transforms a sense of duty into the pride of the creator, and that's a powerful factor in cars as well.

And just like in the days of Michelangelo, we still work with clay when making cars.

"Find form in clay," said Michelangelo.

Look at this, it's a car

100 years of opening Can you feel it?

This is quite different from the previous one, isn't it?

There's also a very interesting car element in marketing, but I won't go into it here.

i want to touch

What makes you want to wash your car? What is this touchable sensuality? That is the essence of sculpture. Sensuality.

And it's shaped by the people who make cars.

In Henry Moore's remarks about sculpture, I think that when thinking about designing a car, what he means by "inner strength" can have an essential meaning.

The will to live, the need to survive, and the power of expression appear in cars and fascinate car lovers

Continue to give instructions until it is expressed as "do this here, do that"

It's totally sick And the result of that passion is beautiful It's so wonderful

This sculpture, of course, is at the center of everything, and it's what infuses the car with a crafted spirit.

That kind of work isn't much different than actually making this thing

It's the same effort, the same beauty.

Now let's get down to business, about cars as art.

On a conceptual level, art is truth, beauty and love.

That's the big difference between a car designer and an engineer.

It's nice to talk about love

On the same level, we can talk about truth and beauty.

That's what we're after. We're trying to find the truth in our work.

not emptiness or beauty

Seeking true beauty

An engineer, on the other hand, looks at things like a scientist, not the quantitative side of things.

Designers deal with irrational aspects and try to accept contradictions as they are, whereas engineers think that 2 plus 2 is 4, and 4 is 4.0, which is more accurate.

This difference of opinion leads to minor misunderstandings.

We also acknowledge that we are the feminine department within BMW. We also acknowledge that we are the feminine department within BMW. BMW is a very masculine company.

On the other hand, we are rather feminine.

We become more feminine because we are interested in form, not just function.

I want to find beauty in itself, not just in appearance.

And it's this spiritual depth that goes into the essence of a great car.

Well, it's safe to say that for me, the experience of love and the experience of design are one and the same.

Through a project called Deep Blue, I realized something about love and design.

First of all, please get acquainted. The word "love", which is used in various ways in society, can be replaced with "design", for example, like this quote.

It's understandable, it's self-evident

"Design and war do not choose the means"

The world is certainly a competitive society.

There was also this song, which seems to describe Philippe Starck, like a young love story.

toothbrush n cool

Everyone becomes serious only when they see something like this

(Laughter) I think it's a substitute for love that we're responsible for.

There's more to love, more to be designed When your neighbors and acquaintances look like this, it certainly might in the future.

But now we're dealing with ourselves, the creative team that I belong to, this is my true story.

As for where we work, when you're building a BMW car, you have to have an emotional connection with the design team.

You have to work like a family, keeping close ties and sharing ideas, that's how you should interpret it.

Sometimes it's good, sometimes it's funny, sometimes it's stressful

Car work sometimes involves going outdoors.

Sometimes I have to work in the rain or snow

For example, this is when I gave a presentation to management.

Management pulled it out in the snow too, just to see what it looks like outside.

still have to go outside

And because they are artists, they have a very artistic temperament.

Okay, so art is discovery Discover yourself through art, you see?

When it comes to cars, we designers project our ideals, and we fall in love with what we create.

This is one of my favorite paintings, and it represents our relationship with our cars.

It's more sick than faith

(Laughter) But it's what allows close-knit teams to take on new dimensions, new meanings.

The car we design mediates the relationship, and we share a focus and a common thread of discussion.

And it's my role to narrow the focus in the competition.

Today I heard about the gene that controls cell regeneration Today I heard about the gene that controls cell regeneration

Sometimes you need to do the same thing

I started with 10 cars, narrowed it down to 5 cars, then 3 cars, 2 cars, and ended up with 1 car design.

i have to throw it away

It's difficult, but you also have to have a strong bond with your staff, and it's only when you have that bond that it's acceptable, because that's the kind of world we live in.

They themselves have that kind of gene.

This Deep Blue project has given me the experience of working with a team in ways I never could have imagined, and I want to share that experience with you, and I encourage you to use it in your relationships.

We wanted to design a car that embodied the essence of BMW.

And I wanted to create a team that didn't work the way it used to.

Instead of using the art crew as pawns, we decided to let creative designers and engineers do the work to find the next most popular car in America after the SUV.

It's a project from 1996. We named the team Deep Blue and sent it off. I'm sure many of you are familiar with IBM's Deep Blue.

It was actually a good choice because we were like, 'Deep Blue, that's cool.'

We were so excited. We sent a team of designers to America and gave them a budget.

I only had their phone number

And the German engineering team decided to let them work remotely. What car should take over the SUV?

Bring your ideas together, compare your notes, take them home, bring them back together, and work on the production together.

And hopefully, in order to get to know our customers better, we want them to live in America, where they live.

(Laughter) When I lost sight of them, all I got was a postcard.

A postcard from a staff member who went to Las Vegas Also from the Grand Canyon This one is from Niagara Falls I think I was in New York right after that Where else was it?

I used to think this was going to be a great car.

Yes, because they rented Elizabeth Taylor's villa in Malibu for less than renting a studio or six or seven apartments.

Well, at least I got a report that it's her house, but I'm guessing you've thrown a party once.

Anyway, this is the house, and the staff lived there.

A living room that's open 24/7. Half a dozen staff members left their wives and families behind to live here for six long months, in America, the setting of the project.

The young woman who participated in the project was a very enthusiastic woman who even built her own room in the bathroom.

The bathroom was so big that they built a bed over the bathtub, which is really cool.

By the way, I didn't know anything about these

It's a lot going on, but all I get is a postcard like Las Vegas saying, "Chris, don't worry, this is going to work."

It seemed they were already beyond my idea of ​​what a design office should be.

The engineers in Munich, on the other hand, were looking for a physical solution, for example, how many cup holders can you fit on one axle?

When these two teams come together, you'll think that great imaginations, in great environments, working together with stressed engineers, can do great things.

But what I didn't know, what we found is that under those circumstances, they can't even talk to each other.

And here's the difference between the quantitative and the physical way of thinking: the discussion was so deep and endless that they couldn't even bring it all together.

And three months later, we had our first meeting in Tibarron. It's not too far from here.

And I was going to present all the results of three months of independent research to my co-mentor on the project and my current boss, Dr. Goschel.

I wanted to get the first hint of how the project was progressing, what could take over the American SUV boom.

I was thinking that it would be great

There's been a lot of work coming in, and it's doing well, and maybe Las Vegas means a lot, and I wasn't sure when the Grand Canyon would come, but when all these things come together, we're going to see some great results.

Three months later, I went to Tibarron, and a week before that, the team got together, and we still had a few days left.

The engineers also came and joined the designers, and they combined their presentations.

So, it turned out that the technician didn't do anything.

They didn't do anything, because in the automotive industry, engineers are problem solvers.

Meanwhile, the engineers were waiting for the design team to say, "We've created this problem, please help us solve it."

And we couldn't talk about it, so the technician just showed up with nothing.

And he said to the designer, "If you let that happen, I'm going to strike. We're all going to get out of the project."

I received the presentation without knowing anything about it I received the presentation without knowing anything about it

A lot of exchanges were written

I spent four hours listening to the vocabulary needed for a conversation between an engineer and a designer.

Every time I turned the page, I expected a picture of a car, a sketch, or a goal to aim for.

The conversation continued about word correlation, and eventually I realized that I wasn't blinded by greatness, but baffled by stupidity.

Can you imagine? The postcards proved the team's greatness for several months, and they should have spent the budget and learned for it, but in reality, this body works.

i was so angry i went mad

I'm sure everyone will remember Chibaron, too.

Four hours later, I got up and went to another room with my team.

So I screamed and yelled, "What the hell have you been doing?

I'm disappointed Are you a designer? Isn't it your job to create What the hell is going on? ”

It was a harsh criticism. I often reprimand my subordinates, but this time I was really harsh. I said, I used BMW's budget and enjoyed a three-month vacation, but I didn't get anything.

In fact, they hid the sketches, photographs, and models that I wanted in three station wagons. To show their solidarity with the engineers, they decided to lock them up and not let me see anything, so that I could have a clue to the problem.

So we went out for lunch. (Laughter) I must say it was a very quiet lunch.

The engineers sit on one side of the table and me and the designer sit quietly on the other.

Furious I was furious

While everyone was having fun, I was different

I'm sure you'll get angry too, right?

So someone asked me about my wife, are you coming with me? what

As soon as I said "no," a lot of thoughts about my wife came to mind.

I remember that when I married my wife, the priest said something very important in a very good sermon.

"Love isn't selfish" "Love isn't about counting how many times you say 'I love you' It doesn't matter how many times you've had sex this month Twice less than last month Don't you love like you used to?"

Love is not selfish." As I thought about this, I thought, "I'm not showing love, I'm not showing affection.

Here in the space I'm in, there's no trust

I was expecting a lot of sketches, but no, that was the quantification method for evaluating teams.

You're wrong."

I told everyone what I just said, and said, "Hey, I think it's not right to have a relationship that can be measured in terms of quantity.

"I'm your boss. Do what I say. Even if you don't trust me."

And in all honesty, we all cried, because you couldn't tell me how frustrated you were at not getting the results I wanted, and all you could do was trust me and wait.

It was a very intimate day with each other, where we got rid of a lot of unnecessary ties, where we became a real team, where we created real creativity.

We put the car back in our minds, we put our love back into it, we put the car back in our work.

By the way, the team has developed six concepts that are prototypes of what could be the successor to the American SUV boom.

One of them is the crossover coupe, the X coupe you can see downstairs.

It's an interpretation of the BMW bike called the GS, which Karl Magnusson called "barbaric and aesthetic" and the idea of ​​what it would be like to have a four-wheeled bike.

In conclusion, I would like to quote from "The Little Prince" to share my lesson with you.

A lot has been said about trust and love, if those two words are synonymous with design.

I had a very meaningful relationship with the team that day, and that relationship continues today.

I hope that all of you will discover the object of your design, break through your individual framework, and devote yourself to the artistry of design.

Trust and love are what make design valuable.

thank you

(applause)

About 15 years ago, I visited a friend in Hong Kong.

At that time I was very superstitious

When I landed - it was still the old Hong Kong airport, Kai Tak was in the middle of the city - I was thinking: if I see something good here, my stay for two weeks will be good, if I see something bad, it will be really bad.

The plane landed between the buildings and came to a complete stop in front of this little sign.

(Laughter) During my stay in Hong Kong, I actually visited some design firms.

After that, I just went to see what they were doing in Hong Kong.

I had a great job offer, but I turned it down.

I packed my things and headed back to Austria, but a week later I was on my way to Hong Kong.

(Laughter) But if that sign was gone, it would be a very stressful job.

It turned out that not only was the billboard still there, but there was this one right next to it.

(Laughter) On the one hand, I realized that superstition had taken over me, and this time I had a really bad stay in Hong Kong.

(Laughter) By the way, there have been a few moments in my life when I've been truly happy, and they're breathtaking, as described in the pamphlet for this conference.

I'm in the habit of making lists, and I've listed everything.

(Laughter) You don't have to force yourself to read this now.

It's so boring to hear about other people's happiness

(Laughter) But to look at it from a design point of view, if we remove the non-design stuff.

So surprisingly, more than half of them have something to do with design.

Of course there are two different possibilities.

One is that I'm very happy when I'm experiencing design from a consumer's point of view.

Let me give you an example from my first Walkman.

It's 1983

My brother owns this great Yamaha bike and let me use it freely.

A cassette of The Police's "Synchronicity" had just come out, and in my hometown of Bregenz, it was a time when helmets weren't mandatory.

I could drive into the mountains and enjoy the police freely on my new Walkman.

(Laughter) I remember it being a really happy moment.

Of course it's related to this combination, but at least two of them were designed.

And then when we talk about design, there's a measure of happiness, and bike events are definitely somewhere in between here, joy and bliss.

And the other is, from a designer's point of view, are you happy at work?

One way to see how happy a designer is at work is the author's photo at the end of the paper.

(Laughter) So this Australian, this Japanese, this Mexican is very happy.

(Laughter) On the other hand, the Spaniards

I think I'm Swiss to a large extent. (Laughter) It seems that it's not all good.

(Laughter) Last November, the Mori Art Museum opened in Tokyo on the 56th floor of a skyscraper.

The museum's opening exhibition is about happiness.

I really wanted to go see it and was paying attention

Interestingly, the exhibition is divided into four parts.

In the exhibition "Arcadia (Utopia)", the word "happiness" was written in many different ways in the Edo period.

This apple was created by Yoko Ono, who later became known as the Beatles label.

"Nirvana" exhibited this Constable painting

And there was some interesting commentary on abstract art.

This blue painting is the work of Yves Klein.

The commentary said that abstracting an image requires familiarity with it, rather than its typicality, and therefore these works attract large audiences.

"Desire" exhibited ukiyo-e prints by Shunsho Katsukawa from the Edo period.

Finally, "Harmony" displayed a Tibetan mandala from the 13th century.

If I had to take anything away from this exhibit, I would probably exclude this mandala. A lot of the exhibits were about the visualization of happiness, but not about happiness itself.

I thought it was kind of cheating, because it's a very easy thing to visualize.

I do it all the time in my studio.

For example this book

A happy dog ​​removes it and becomes an aggressive dog

This is a happy David Byrne and an angry David Byrne

jazz poster happy face and more powerful face

it's not difficult

There's a trick to advertising. The subject of "happiness" has gotten a bad rap in the film industry.

this is a movie poster

This is the Talking Heads box set that came out two weeks ago, and this cover shows happiness in a visible way, but also shows a dark side.

Designs that evoke happiness are even more difficult. Here are three designs that actually made me feel happy.

The first was by a young artist living in New York who calls himself True.

Anyone who's ever used the New York subway will be familiar with these signs.

Tru made his version of this sign

I meet 20 friends at the subway station every Wednesday.

Say goodbye to each subway line and add their version

(Laughter) This is one of them.

(Laughter) This method works because no one has seen this sign before.

When you (laughter) get tired of the subway and stare at something,

It will take a while, but you will notice that something is different.

(Laughter) At least it made me feel happy.

Hold no grudges/No rides with despair Stay hopeful Tru is truly humane

I handed out these fake volunteer cards to everyone so that no one gets arrested.

(Laughter) And this false notice from the Department of Transportation, pretending it's an art project sponsored by the Department of Transportation.

(Laughter) Another New York project

It's a square room sculpture in MoMA PS1, by James Turrell, with a retractable roof.

I open and close it every day at dusk

i don't see the horizon

You just stand there and watch the incredibly subtle shifts in color of the sky.

This room is a must see

going there will change your life

I haven't seen the sky like that since I spent an hour there.

Of course, there are many more than the three projects I have introduced here.

Vik Muniz's "Cloud" is a must-see. I saw it in Manhattan about two years ago and it made me very happy.

The last one I'd like to introduce is also by a young designer from New York.

he is from korea

He printed 55,000 speech bubbles, blank speech bubbles, large and small.

I put it on posters all over NY

(Laughter) And other people wrote on it.

(Laughter) It says, "Please let me die in peace."

(Laughter) What surprised me the most is that the writing is just amazing.

Here's a poster for a musician who said, "I don't think my CD will sell more than 200,000 copies. To preempt my losses, the record company will cancel my contract, and I'll be back on the road covering Bleecker Street."

(Laughter) What's great about this piece is that there's something for everyone involved.

Gee's project creates an environment that intrigues people, and some people get a place to express themselves, and as a result, someone pays attention to this ad.

(Laughter) The question that I've had for a while is, can design do more things we like, and can we do less things we don't like?

Then I started making lists again to see what I liked about my job.

one can work without pressure

Then you can concentrate without getting tired

Nancy used to say that she likes it and immerses herself in it

do the same thing and don't get bogged down or get stuck at the computer

It means getting out of the studio.

And then touching things, content is very important.

and you can enjoy the results

Then I made another list of things I've learned every day of my life.

Right about that time, I got a call from an Australian magazine with six designs in six spreads, divided between the different chapters of the magazine.

I was asked if I would like to combine them into one as a whole.

I chose one from the list, in this case, "Everything I do always comes back to me."

All my actions always come back to myself

About two weeks ago (Laughter), a French company commissioned five billboards.

we provided content again

hire another

this was two weeks ago

I flew to Arizona with a designer I work with and made this picture.

Trying to look good limits your life

and another

It's from a magazine, and the pages are separate.

This is the same thing as "Having," taken from the side.

this is a shot from the front

"guts" (courage)

This is the same room before work

This "always" "works out"

"for" in the light of the light

(laughter) "me" (Courage always works for me)

thank you

(laughter)

I thought I'd read a poem about the old and the young.

In a way, I was very surprised because there were actually a lot of poems like that.

The first is a tribute to Spencer and his grandmother, who was inspired by his work.

my poem says "dirt"

My grandma washes my mouth with soap Half a century later, that thick yellow soap is disgusting, but my grandma still comes up to me with it

Because I uttered a word, in fact I just repeated it rather than said it.

But my grandmother said, "Open up, open your mouth."

grab my head

Now I know how hard my grandmother's life was. She lost three babies, and then her grandfather died, and she was left with a young son and poverty.

My grandmother made me stand in the sink to pee because there was no toilet.

But oh soap!

Maybe that bitter and intense experience made me a poet?

My grandmother lived on an unpaved street Her apartment had two small rooms and a smelly kitchen She hid in the kitchen and caught me

Should I say that I never loved my grandmother after she did that to me?

My grandmother lived to be 100 years old - all I had was sorrow and filth I never loved her after that

When this poem appeared in a magazine, I got an angry letter from my uncle.

"You badly wrote a wonderful woman."

I needed an excuse for that

Next is the poem "Dress"

it's a very long poem

At that time--and it's now just the most elusive memory for me--the first thing I heard first thing in the morning was the loud chirping of birds, and then the soft hooves of the horses, bringing milk from house to house. Weaken all this long ago Women, my mother, my friend's mother, my neighbors, I know they all wore a house dress all day long It's cheap and printed and soft and apparently deliberately clumsy A shift dress that you wear over your nightgown And you wear it when you have to go look for your kids, you just wash it and hang it on a string And you can wear it under your coat when you're heading to the store near you The twisted hem of your nightgown is always slender and yellow and hangs below

Much more than the curlers some women always wore in their hair (Maybe they were prepared for some big event, even a dance party that was never called for) Not only did they not wear make-up during the day, but they were rubbed and bleached, their eyebrows plucked, they were like hideous masks - much more than women's faces, much more than all that It was that dress that made women incomprehensible and inaccessible The riddles that women mastered The mystery that men were inaccessible to Taku boys can't even imagine

You'll later realize that dress was a declaration In the dim kitchen, in the laundry, in the cold concrete garden, it was a hoax to make you look like you were exposed.

At the time, people were hiding a lot of other things too. Adult men hugging each other wasn't always, at best, when they died. Handshakes, or in baseball, knocking a friend on the back with a fist, or a light fistfight were signs of intimacy. Now my father's beard is white and stiff.)

A hug is the last thing to let loose We're cautious (it might sound bold) How much unspoken pleasure was in affirming equality and fellowship No matter how much misunderstanding and pain had been exchanged by then

I didn't know anything then, maybe I still don't know There's a cure for this pain Even women in the best dresses, in beaded and sequined undergarments, lipstick and mascara, untied hair, standing with their hands together, wishing for peace, but fathers and sons, like gangsters, like thieves, like Roman soldiers, simmering, hissing, hating, inflicting the worst pain that lasts forever, is a kiss. Brothers' blood ties are handed down to descendants through ties and hugs

In those days, even near the city, there was the countryside, with farms and cane fields, and cows, with long, dim brick corridors, and not far from our building, we found green spaces with hills and trees.

Or you go out on your own, into a clearing half a block away, good to hide in the bushes Crouching and pushing through like creatures in foliage Simplifying, savage and lonely Already there, wanting something simpler Even if they call you, you'll never go back.

(Applause) This is another long piece about the old and the young.

In fact, that's exactly what happened when we met.

Part of this poem is the events in our shared place and time.

is a "neighbour"

Her five terrifyingly deformed little dogs Beneath this side of the window, on the roof, barking incessantly.

I don't know how many her cats are but they must be peeing on her rug Her landing stinks nauseating

I saw her shadow once, searched the door chain, slammed the door down, dogs barking and the music, this is jazz, blocked out, echoing in the hall all day long.

Back when Chris Conner was singing "Rush Life" "How am I going to get that pretty girl back on the canvas My first love--until I throw it away" Playing the same records all the time

With my head on my shoulders and my hands on my thighs We sang sweetly together of regret and loss She was too young I was too young Later on I can understand her pain

It surprised me, bored me, and rejected me

Reached an escaped building in the Village When I started to think of her She was my neighbor

I wish we had met and found each other and become friends.

The girl I was seeing isn't her at the mailbox

Blonde with gray hair Under the nightgown is army pants She turns and hides her battered face with her hands

Occasionally, something surprising happens in the stairwell

A man is yelling "Shut up!" The dogs are growling desperately Scratching with their claws And she, Her voice is husky, nasty and muffled Hardly out of tune, incoherent, yelling at one note Bone on metal, metal is melting away Screaming back "Come back darling, come back my dear dog"

Come back my dear angel

The next time I saw her, she was Princess Medea.

A witch, ecstatic and ecstatic She sat still on the pavement Hooking her ragged overcoat unbuttoned Passers-by stared at her She screamed and opened her mouth Quiet but her brain and chest were erupting.

Purely lamenting in solitude over and over I don't need a voice, but I can't take it anymore

These invisible and fascinating connections, these metamorphoses, even in agony, embrace us.

That girl, the love of a distant day The last time I lost her When you came to find me at the party She was drunk Staggered to the ground In an awkward sprawl Her skirts rolled up Her eyes were bloodshot and swollen with tears It's embarrassing, it's humiliating

I turn a blind eye to my arrogant and vulgar side of my pride

Still living on the roof Dead trees in barrels Broken benches Dogs Hung Sky

What's the way through the pain, what's the weak connection, what's the crossing and the opposition?

Our lives are already full There have been many sad times There are many unexplained pasts

"Watch me" God of madness Endless love says Astonishingly high "Watch me"

She goes on and on Down the messy hallway stairs Every step is painful

i hold the door

She's crossing the tiled floor Staggering on the steps to the road She's fallen but I can't see her "Can you help me?"

take my arm and lean on me lightly

A step that swings toward the outside world

She whispers, "Thank you dear," Leaning a little on me

(Applause) Let's make it a little brighter.

(Laughter) Another poem about the young and the old, in a different flavor.

"gas"

(Laughter) The blue-haired lady is in the doctor's waiting room.

I wish I could have seen the intestinal gases coming out in visible clouds and grazing past my face before this most innocent eruption drifted away.

(Laughter) By the way, what just happened was a good coincidence, because not an hour ago, while I was walking, my dog ​​was startled by a backfire and jumped straight up like a horse.

And then I remembered that when I was 12, I used to work on the weekends, a wonderful spotted male, and that horse would always hop like this when he saddled it, although it was bigger and bigger and gleaming and brighter, of course.

The sight of the woman covering her embarrassed red face with ELLE reminds me of something I've forgotten That's the fear in me That's the horse farting so badly every time it jumped.

Boo! Boo! Boo!

Something neither the many books about horses nor the jockeys who fascinated me at the time pointed it out.

Everything is savage and mighty Shining hooves of steel Ejects from the creature's mighty entrails Breath stops, heart stops, nostrils open wide I don't know if I want to stop this horse or want to be this horse.

(Laughter) (Applause) Next is thirst.

A lot of my poetry is actually urban poetry, but I happen to read some that aren't.

"thirst"

This is my relationship with a woman who spent days and nights on a bench at the 103rd Street subway station last fall and winter, and then disappeared one day.

We respected each other and stared at each other

I'm shy, roundabout, but not sneaky

When the bottle was empty, she was bold, calm, belligerent, angry

I was afraid of her, I felt like a child

I feared the repressed part of myself would run wild And forever trapped in the shocking stench of her wrath.

It's not just excrement, it's not the surface, the exit is unwashed, the rum is flowing, there was will, and intention, power, purpose, social and ethical, anger, rebellion, despair, sadness, even loss.

Sometimes I thought I should drive her home and bathe her and make her comfortable and dress her.

I don't think she wanted me to do that.

Instead I boarded the train

How rich is the vocabulary of self-indulgence

How enduring is the emotionless fatal conviction that recollection is a perfected justification.

The dance of our gaze Collisions Pulling each other Perceptual collapse Then the Holocaust Holocaust Origin of the lesion Wounded existence Wasting Consuming

As far as I know, her nightly surveillance continues.

she's there watching with perfect honesty

A dance of gaze Challenge Abandonment Annihilation Fragrance of astonishment

(Applause) This is a new poem, a poem that just came out.

Title: "Accident"

A student A schoolgirl is in a high school hallway on the fourth floor She's sitting on the edge of an open window Talking to her friends at recess A teacher walks by and scolds her, "Be careful you're going to fall." If it wasn't winter, someone must have closed it "Close it!"

she fell

Light shocks and fantasies I've never thought of it before I still can't think of it

It's nothing more than shocks and fantasies That girl knows what she's been doing That girl means something That girl's gonna be humble That's what she thought in that moment Beautiful or not beautiful Smart or not She's not who she is She's not who she is The reason she knew it right away 'Cause there was a well-crafted plan where she was There were a lot of schemes and plans where she was There can't be a man, if there is, it's not her, it's not all of her That she lives and lives by herself And the way she thinks of it, she knows what's missing Grace, not planning Grace, being in the world in a way spontaneously, with grace

It was the world that weighed down on me

Heavily made this world graceful Never been perfect

A heavy weight upon me Freedom from what I crave and what I achieve

The girl remembers a moment of eternity Already now Many times were divided Just for her to live on her own The sadness she once felt Little did she even know what she felt

Yes, that girl fell, it's absurd Even on earth, she impulsively claims that everything that falls knows it's absurd Isn't that girl's fall about me or is it me?

forever with grace

It was an "accident"

(Applause) I'm going to read one more thing, and I don't usually say this.

I want to finish well

I don't want Ricky to show up and have a fist pointed at me.

It's an "old man".

"Feature: Big Boobs" Advertisement for an adult magazine on a local newsstand.

But her plump breasts too

Blond hair with youthful lips and golden skin Lying dazzling but let's forget about it

Almost 60 years old and I hardly know myself Not better than a whore Still disturbs me

In America's voluptuous darkness, I never saw beautiful nipples or mosaic-free vaginas, so I'm getting old.

Always murmuring lustfully I can't be myself if I'm not in the initial state of desire

God knows Your obsessions fall into it There could be worse things to come

Last year in Israel, when a young, highly orthodox rabbi took several teenage girls to visit the Holocaust Memorial, they forbade them to look inside a room.

because he said there were questionable images

The exhibits were photographs Naked men and women stripped of their clothes Some of them tried to hide their genitals Others were too frightened to care They stood in line in the snow waiting to be shot and thrown into a ditch

It was more terrifying to me that girls turn away from such things.

What kind of sexual distrust did the teacher teach?

Yet another confession Once upon a time, a book about Poland on the eve of war Studio portraits The absolute angel has eyes that make others suffer

I find myself again and again on her page

I never wondered why her death in the camp, but it made it more real, more precious.

The people who died in the camps were, of course, humans, but they were Jews, but they didn't show the books to the children.

But it was like sex I didn't need to be taught

sex and death seem so close

So I've been conscious that death is looming over me, and I think it confuses them sometimes.

I'm rather exhausted by my wife's loveliness

My passion for her transcends rational boundaries

When we test our love she holds me everywhere around me with or without me

My spirit is full My face and my voice and my senses are chapped I've been living my life like I'm drowning

And I'm drowning in despair when I have to leave her

Still now I can die without any particular regrets, without being slaughtered, without becoming a slave

It may be salvation that I don't have to know the mad anger and regression in the future

no no no

The truth of what I just said

So the world is holding me so tight For better or for worse In my own stupidity and weakness With fake passions Even this fake Venus And her breasts are probably full of silicone Moves me so hard it takes my breath away

Bewitching Woman, Siren, Seductive Woman

How she reveals in the glow of her tattoos more than she intends

How reverently she embodies our insatiable human desires Our passion to live beautifully To be beautiful To be admired by being seen If you don't love me more If you don't love me

thank you

(applause)

Newspapers are about to die out

Readers don't want to pay for outdated information, and advertisers do.

Instead, it's much easier to use a mobile phone or a computer than a Sunday newspaper.

We must also save forests

This would destroy any industry.

So the question should be changed to "Is there a way to save newspapers?"

There are several possible scenarios for the future of newspapers.

Some people say, "It should be free," or "I'd rather have a tabloid or smaller A4 size."

"Newspapers should be opinion-based" "Less news, more opinions"

"If possible, I'd like to read it at breakfast." "I listen to the radio later in the car on my way to work." "Check emails at work, watch TV at night."

Sounds good, but it's all about buying time

Because I don't think there's any practical reason why newspapers should survive in the long run.

What can we do there?

(Laughter) I did this

Twenty years ago, a Swedish publisher called Bonnie started a newspaper in the former Soviet Union.

Within a few years it was publishing several newspapers in Central and Eastern Europe.

They were run by inexperienced staff, they didn't have a culture of aesthetics like layouts, they didn't have a budget to spend, and many newspapers didn't even have art directors.

I decided to become an art director for a newspaper.

Before that I was an architect and my grandmother once asked me what do you do for a living?

I replied, "I'm designing a newspaper."

"There's nothing to design. Just boring type." (Laughter) She was right. I was frustrated

When I came to London one day and saw a Cirque du Soleil show

They made a big discovery: "These guys are creepy."

That's why I thought, "Maybe I can do the same thing with a boring newspaper!"

And so I did. I redesigned it one by one.

One side became our signature

It was a private channel for me to interact with my readers at close range.

I'm not going to talk about teamwork or collaboration here

my ways were so selfish

I wanted to make a statement as an artist, I wanted to interpret reality in my own way.

I wanted to make a poster, not a newspaper

Not even a magazine, a poster

We were experimenting with the presentation of text, as well as illustrations and photographs. That was very fun

They began to give immediate results

In Poland, our work was chosen as "Cover of the Year" for three consecutive years.

Other examples here are from Latvia, Lithuania, Estonia, and countries in Central Europe.

But it wasn't just one side

Our secret was that we treated the whole newspaper as a work, like a piece of music.

Music has rhythm and ups and downs

The design has a responsibility to let the reader experience this.

The reader feels various things while turning the page.I am responsible for the experience.

We thought of the two-page spread as one page, because that's how readers perceive it.

The pages of this Russian-language newspaper won many prizes in Spain's biggest information graphics competitions.

The first prize is from the News Design Association

Within a year of redesigning the newspaper in Poland, it was hailed as the best designed newspaper in the world.

And two years later, an Estonian newspaper won the same award.

It is not great?

And what's even more amazing is that the number of subscriptions to these newspapers has steadily increased.

To give you a few examples: in Russia 11% increase after 1 year 29% increase after 3 years of redesign

Poland also saw a 13% increase in the first year and a 35% increase in subscriptions after 3 years.

As you can see in this graph, after years of stagnation, as soon as we redesigned the newspaper, it started to grow.

But the number one hit was Bulgaria

this was so amazing

Did the design accomplish this?

Design is only part of the process

The process we took wasn't just to change the look, it was to completely improve the product.

I applied the cardinal rules of function and form in architecture to the content and design of the newspaper.

I put a strategy on top of that

Think about what's important first. What are you doing it for? where is the target?

We will adjust the content from there.

After that, I usually start designing about two months later.

My bosses were very surprised at first

Why are you asking such a business-like question instead of just showing me the manuscript?

But I soon realized that this was the new role of the designer, to be involved in the process from start to finish.

What is the lesson to be learned from this?

The first lesson is that design doesn't just change the product.

You can change the workflow, or rather, you can change the whole company.

you can change yourself

Who's to blame? I'm a designer

Empower the Designer

(Applause) But the second lesson is more important.

You too live in a poor country like me

While working in a boring department at a small company

You have no budget, no talent, and you can still bring your work to the highest level.

Anyone can do it

All you need is inspiration, vision and determination

And remember that just being "good" isn't enough.

thank you

I started with paragliding

You put on a paraglider and fly from the top of a mountain.If you're lucky, you can fly long distances like cross-country using only updrafts.

In addition, you can also perform aerobatic maneuvers.

I started skydiving from paragliding

This is a picture of a four-person skydive, four people flying together, and on the left is the cameraman, who has a camera on his helmet that can record the jumps as they fly together and can be used for judging.

Moved from general relative skydiving to free flying

Free-flying is a more three-dimensional dive

The photo shows a diver in a red jumpsuit standing up.

The one in the yellow and green suit has his head down.

And that's me in the back, filming the whole formation with a helmet camera.

From free flying to sky surfing

Skysurfing is diving with a surfboard

Imagine a skyserve board with a large surface area, which adds a lot of force.

Of course, you can use that power to do things like spins called helicopter moves.

From there I progressed to wingsuit flying

Wingsuit Flying allows you to fly using only your own body.

If you force your body and pull your jumpsuit up, you can fly because you fall much slower because you have a larger surface area.

With the right posture, you can actually move forward and fly very long distances.

This is the jump I did in Rio de Janeiro

Copacabana Beach is on your left

With all these skills and knowledge from paragliding and skydiving, I went on to BASE jumping.

BASE jumping involves jumping off fixed objects such as buildings, towers, bridges, and the earth, such as mountains and cliffs.

To me, it's an omnidirectional, ultimate free-fall feeling.

My goal eventually became to find a place no one had ever flown before.

In the summer of 2000, I became the first person to BASE jump from the North Face of the Eiger in Switzerland.

Two years later, I BASE jumped for the first time off the famous Matterhorn, which you all know.

From Eiger, Monk and Jungfrau in 2005, all well-known mountains in Switzerland

What's special about these three jumps is that we did them all in one day, including the climb.

Jumped off the Eiffel Tower in 2008

(Laughter) With this knowledge, I wanted to do stunts.

So, I used various techniques with my friends, for example, jumping from a paraglider like this

Or something like this, where we filmed in a very cold place in Austria, and everyone was freezing except for me.

Everyone's sitting in a hot air balloon basket, but I'm at the top of the balloon trying to skysurf down.

And this is a jump from a truck on the highway.

(Laughter) Extreme sports at this level are only possible through practice, practice, and rigorous skill and knowledge.

Of course, I have to be in very good physical condition, and I train a lot.

I need the best equipment

And most importantly, mental skills, mental preparation.

All of this brings us closer to the human dream of flight.

So in 2009 I'm training for a new project

One is to fly off a cliff in a wingsuit and set the world record for the longest distance.

I want to update the longest distance ever flown.

Second, I want to do a sensational jump that no one has ever done before.

So in the movie that follows, you'll see that I fly a wingsuit much better than I speak English.

enjoy thank you very much

(Applause) (Applause) Jane Cohen (JC): I have a few questions.

everybody has a question

Question 1 Is that similar to what it feels like to fly in a dream?

i think it might be

Weli Gegenschach (UE): It's probably the closest thing to feeling like it's flying.

JC: I know the answer, but how do you land?

UE: It's the parachute. I open the parachute. Seconds before the impact of landing, yes.

(Laughter) I still can't land in a wingsuit.

JC: But someone's tried it, you too—you don't—how do you land in a wingsuit?

UE: It's a dream yes

It's a work in progress, we're developing wingsuits for better performance and more knowledge.

i think i can do it soon

JC: Okay I wonder what will happen I have two more questions

What's the exhaust like? The one from the wingsuit Does the wingsuit have any thrust?

UE: No it's just smoke

JC: Is it from you?

(laughs) UE: Gladly no.

(laughs) JC: It's dangerous, isn't it?

UE: No, there are two reasons for the smoke.

That's reason number one, reason number two, because the smoke makes it easier for the camera crew.

JC: Okay, so the wingsuits are intentionally smokey to make it easier to follow. Another question.

What do you cover your face with?

With that much speed, I feel like my face will be pulled behind me

Are you wearing a helmet? Or goggles?

UE: Only goggles are the purest and best feeling

JC: Do you usually fly like that?

UE: Most of the time, I wear a helmet. In the mountains, I always wear a helmet. Because the landing is always difficult.

must be prepared

JC: Okay, is there anything you "don't" do?

Many people came and said, "I want you to do this!"

Have you ever said, "No, I won't do it"?

UE: Of course, of course, because some people think crazy things. (Laughter) JC: Applause.

(Applause) UE: Thank you very much.

(applause)

Wilson International, the world's largest plastic laminate company, was commissioned to design an exhibition booth for the International Contemporary Furniture Fair in New York in 2000.

So we started by looking at the three main markets for their products: transportation design, interiors and furniture, and we decided to come up with a solution that would be to strip out the old trailers and present them with laminate film and trailers in a brand new, modern way.

When this trailer arrived at my store in Berkeley, I had never set foot in it.

So I was able to look at this in a whole new light and be the person who could best reflect the ideal style.

Through research, I decided to figure out where in history Airstream went astray.

When I looked at the interior, I noticed that the exterior and the furniture didn't go together.

Originally, the exterior was conceived as a lightweight, modern, futuristic, high-tech container to zip around on the highway, so it didn't quite fit in with the interior.

Actually, I felt like I was looking at a mountain hut.

I found it a big problem that they haven't been able to express the vocabulary of escape, travel, modernity that fits the look in this trailer.

To figure out what a true Airstream trailer is, and what its true purpose and usefulness is, we had to turn to archeology.

I stripped off all the vinyl and Zolatone paint that was covering up the amazing aluminum shell.

I removed all visible metal parts.It was like organizing a mountain hut.

I used the walls of my trailer to draw life-size drawings on cardboard, cut them out and rethink them, take them out and put them back in.

The ultimate goal was to smooth out the interior and incorporate elements of flow, mobility and independence.

The biggest difficulty with trailer design is that the starting and ending points of the fabric don't exist logically, because the shape of the trailer is continuous.

There are no elements that combine two walls and a roof that can be changed in material or shape.

this was the challenge

So what I wanted to emphasize was that we took materials and laminates as composites and bent them in two dimensions.

This is a composite curve interior

We had to devise a way to trick the eye into believing that all the panels were curved like the shell.

The idea came to me to put a second surface on top of the aluminum shell.

And the challenge is to show the surface from a different perspective, so that the formwork doesn't spoil the atmosphere, and guides the eye.

So without tearing the surface off, I was able to rewire and power it, and it worked as a wiring harness.

this is almost finished

It is thanks to this that I received a request for an exhibition called Tokyo Designers Block.

This is a furniture design event held in Tokyo in October.

A man named Teruo Kurosaki, who runs a company called IDEE, asked me to transport two trailers to Tokyo.

One of them said he wanted to build and sell a working real thing.

He asked me to play around with the second one.

We came up with this fanciful scenario of a DJ running around the United States collecting records and going on tour.

Two turntables, a mixer, a small bar, a refrigerator and a trailer with a built-in sound system.

There's also a huge sofa for a large number of people.

This trailer gave me a unique perspective on what travel and escape is.

We packed a lot of ideas into the Airstream trailer.

I remember when I started talking to Airstream

They said to me, "How can I make this come alive?

And do young people like skaters, surfers, rock climbers use this stuff? ”

I replied, "I don't have this interior."

(Laughter) Anyway, during this prototype, I went to Airstream six times, and it's called Prototype Bambi.

I thought, 'Oh my God, I can finally work for a big company that can fund machine tools and foundry.'

I walked into the prototyping shop, which was big, but no different from my shop, same tools, same stuff.

This is a dilemma for me, because I had to design the interior with the same technology as before, and I couldn't afford the construction method.

The fact the trailer itself is handmade

Since the frame mold is also hand processed one by one, it is impossible to cut out 100 parts for 100 trailers.It is necessary to cut out a large size for manual work.

They didn't seem to be looking for a system that emphasized efficiency.

Finally, let me introduce Bambi 16.

(applause)

First of all, I would like to talk about the scenery of the war.

Little is known of the danger that awaits

Improvised explosive devices called IEDs are being planted all over the road by Iraqi dissidents.

By 2006, such attacks were numbering 2,500 each month and were the leading cause of death among US soldiers and Iraqi civilians.

These improvised bombs are dismantled by bomb squads, called EOD teams, who are the first line of roadside explosives disposal in the United States.

Each EOD team is responsible for defusing approximately 600 bombs each year, defusing about two bombs each day.

You can see how important they are by the fact that the Iraqi dissidents are offering a bounty of 50,000 dollars for each EOD soldier.

Unfortunately this story doesn't end well

If the soldier gets close enough to see the fuse, the bomb will explode with a blast.

Depending on how close you are and how much explosives there are, you could be killed or injured, and you'd have to be about 45 meters away to avoid that.

The blast is so powerful that even a non-direct hit can break a limb.

Because this soldier was on top of the bomb

When the other team members approached, there was hardly any body left, and that night the commander was on a sad mission to write a letter of condolence to the United States, telling us how hard it is to lose one of the bravest soldiers who has saved the lives of our comrades so many times.

And the commander apologizes for not being able to return the soldiers safely to their country.

But he taught me that even in such a reality, there is a ray of hope.

"Even if a robot dies, you don't need to write a letter to its mother."

It sounds like science fiction, but this is already reality on the battlefield.

The soldier here was a 19-kilogram PackBot robot.

Now, instead of letters being sent to farmers in Iowa like in the old war movies, letters are sent to iRobot, a company named after Asimov's novel and Will Smith's crap film.

In the world of fiction, you start out with everyday chores, and after a while you're making life-or-death decisions.

that's the reality today

Now, I'm going to project a picture behind me so that you can see the real world of combat robots in use or in prototype form.

just a little

In other words, we're not talking about [Star Trek] Vulcan tech or teenage geeks.

It's all real, so let's take a look at the pictures.

Today's battlefields are undergoing perhaps the biggest shift in human history, even though the US military went to war in Iraq with just a handful of drones.

now there are 5300

We didn't have a single land-based unmanned system, but now we have 12,000.

The technical term "killer application" takes on a new meaning here.

We have to compare the Ford Model T and the Wright brothers' planes with what we're about to see.

we are in that era

An Air Force lieutenant general I met recently told me that soon we'll have tens of thousands of robots on our battlefields, and these robots are not just mass-produced robots, but tens of thousands of these prototypes that will be used in the future, the robots of the future. probably

That means that the kind of things we talk about at science fiction conventions like Comic-Con are being debated at military power centers like the Pentagon.

Robot innovation is happening

I would also like to clarify

The revolution that actually happens is not the Governor of California showing up on your doorstep as the Terminator. When historians look back and look at our times, they will say that we were in a different revolution, a revolution of war, just like with the invention of the atomic bomb.

But things may be more serious than that, because unmanned systems affect not just how combat is fought, but at a very fundamental level, who fights it.

It's whether the previous revolution in warfare, whether it's the machine gun or the atomic bomb, shoots faster, goes farther, and has more power.

That's true with robots, but robots also change the way we think about soldiers and the fundamental definition of a soldier.

In other words, the 5,000-year monopoly of mankind on the battlefield is crumbling in our time. Over the last few years, I've met here and there all the players in the field, from robotics scientists to the science fiction writers who inspired them. I asked them, and what was interesting was not just their stories, but how their experiences influenced society, legal systems, ethics, and so on.

First, future warfare is not an American monopoly, even with robot soldiers.

The United States is currently leading the way in military robotics, but as we all know, in the world of technology, first-mover advantage doesn't last forever.

Let me ask you, how many people here are using Wang computers? It's the same in war, although England and France invented the tank.

It's Germany that found the right way to use it, and what we have to think about is that while the United States is so far ahead, 43 other countries are developing military robots, including Russia, China, Pakistan, Iran, and others.

An even bigger concern arises from this

In this current revolution, given the production system of this country, the education system of science and mathematics, how do we move forward?

In other words, what does it mean to be increasingly on the battlefield with weapons made in China and combat software made in India?

As software has become open source, so have weapons.

Unlike an aircraft carrier or an atomic bomb, you don't need a huge production system to build a robot, off-the-shelf.

Some of them you can even build your own. One of the things you just saw is a throwaway Raven drone that for $1,000 you can build the same one that the soldiers in Iraq are using.

This raises a new problem of war and combat: good guys can play around with their hobbies, but bad guys can do the same.

The intersection of robotics and terrorism can be both fascinating and alarming, and I've already seen it begin.

During the battle between Israel, the government, and Hezbollah, the non-government, the non-government flew four types of drones toward Israel.

The Jihad website allows you to remotely detonate Iraqi improvised bombs while sitting in front of your computer.

So we can see two trends here.

The first is the growing power of individuals over governments, and the second is witnessing the growing arena of terrorism.

That future may lie at the intersection of Al Qaeda 2.0 and the next generation of Unabombers.

Another thing to remember is that you don't have to convince a robot to blow itself up that it will have 72 virgins after death.

This knock-on effect affects our policies as well. One of the people I met was a former assistant secretary of defense in the Reagan administration. He said, "I like this system because it saves American lives.

It's easier to support the use of force when you know it costs nothing."

Robots seem to be influencing the prevailing public opinion across our nation, and driving it to its logical end point.

We don't have a draft, we don't even have a declaration of war anymore.

I don't buy war bonds

And instead of sending American soldiers into high-risk areas, we're sending machines, which makes the bar for war even lower, and eventually there's no deterrence.

At the same time, future wars are also YouTube wars.

So our technology doesn't just keep soldiers out of danger.

It's designed to record everything they see.

We're not just isolating war from the public, we're rebuilding our relationship with it.

There are now thousands of video clips of the Iraqi fighting on YouTube, mostly from drones.

It is the front line of war and home

There's also the positive side of connecting in a way that's never been done before.

But let's not forget that in a world where anything can happen, you can download these clips and put them on your iPod or Zune for entertainment.

Soldiers used video clips like this

It reads "war porn"

A classic example I've seen recently is a video attached to an e-mail of a Predator attacking an enemy base with a missile, and the explosion, blowing the flesh apart into the air.

it has music

The song was "I Just Want to Fly" by Sugar Ray.

Seeing more and experiencing less is straining the relationship between the masses and war.

this is like sports

It's like watching a professional basketball game, the NBA, on television and seeing the players as little dots on the screen, and going to see the game for yourself and understanding what a 2.10 foot person actually looks like.

But remember, these are just videos

In the digest version of the match it loses its context

lost strategy

Lost humanity, war is just slam dunks and smart bombs.

The irony is that even though future warfare will involve more machines, it's human psychology that drives them, and it's human faults that make war.

The reaction from the political world to this has had a profound effect on the idea of ​​real war, that we are fighting extremists.

How are the messages we send with these machines being received?

One person I met in the Bush Administration's Office of General Affairs said, "This affects our power. It's our technology that threatens the people."

But when you go far away -- let's say Lebanon -- and you meet people, it's a very different story.

"This symbolizes the cowardly, ruthless, cold-blooded Americans and Israelis who send their machines to fight us.

They don't fight like men, they're afraid to fight, so we win by killing those few soldiers."

Future warfare is shaping a new type of soldier that will redefine what it means to go to war.

You could call it a private room soldier.

A Predator pilot who fought in the Iraq War without ever leaving Nevada said,

"I go to war for 12 hours, I shoot my weapons at targets, I order enemy soldiers to be shot, I drive home, and 20 minutes later I'm at the dinner table talking to my kids about their homework."

Now, it's very difficult to balance these things psychologically, because the truth is that these unmanned fighter pilots suffer from PTSD at a higher rate than the actual soldiers in Iraq.

But some fear that this disconnect will make war crimes more accessible. "It's like a video game," said a young pilot attacking enemy units from afar.

If you've ever played Grand Theft Auto, you know that people do things in video games that they wouldn't do in person.

And what I'm trying to say here is that technological innovation also has a different facet, which is shaping warfare now and possibly in the future.

Besides Moore's Law, Murphy's Law is also at work.

The war clouds have not disappeared

Even the enemy has the right to choose

We're going to have incredible capabilities, but we're also seeing and experiencing new human dilemmas. Now, sometimes we fail. That's what the head of a robotics company said. So what is failure on the battlefield with robots?

Sometimes it's funny, sometimes it's like a scene from the movie "Strange Relationships" with Eddie Murphy, and a new robot with a machine gun that comes to life during the demo, circling around and aiming its own machine gun at the VIP seats.

Luckily, no ammunition was loaded and no one was hurt. But when it wasn't, the failure was tragic. Last year in South Africa, an anti-aircraft gun had a "software problem" that caused it to malfunction and fire, killing nine soldiers.

We also have a strain on international law of war and liability. What do you do with unmanned lethal weapons?

What is an unmanned lethal weapon?

We've already experienced three times when we thought the Predator had bombed bin Laden, but it wasn't.

this is who we are today

I'm not talking about an autonomous weapon system that has the authority to fire.

don't think it won't come

During my research, I saw four DoD projects with such characteristics.

You're going to ask yourself, what does a war crime look like? Machines don't have feelings, so they don't get upset when their comrades are killed.

I don't go out of my way to commit crimes or take revenge.

But machines don't have feelings

Like you look at a T80 tank, you look at an 80-year-old grandmother in a wheelchair, because it's just a series of 0's and 1's.

So there's a question to think about: how do we adapt the outdated 20th-century laws of war that are covered by long-term care insurance to 21st-century technology?

So to conclude, I've talked about what the future of war might look like, but keep in mind that I'm only giving real-life examples.

This is something you should think about long before a Roomba vacuum sucks up your life.

Revealing the secrets of what is used in warfare looks like science fiction and it's easy to turn a blind eye.

Do we face the reality of 21st century warfare?

Will our generation repeat the same mistakes that previous generations made with the atomic bomb and fail to deal with things until Pandora's box has been opened?

I may be wrong about this, as one Pentagon robotics scientist put it: "For robots, unless they repeatedly kill the wrong people.

Even if it were to happen without any social, ethical, or moral issues

It's just a recall issue."

And the last thing I want to say here is that we can look to Hollywood.

A few years ago, Hollywood put all the characters together to create a list of the top 100 heroes and 100 villains of all time in Hollywood.

Made it onto both lists Terminator, a robotic killing machine

This shows that our machines can be used for good or bad, but I also think it shows the duality that humans have.

This week is a week to celebrate our creativity. Creativity sends us to the stars.

create works of art and express our love in words

And now we're channeling that creativity into building amazing machines with incredible performance, and one day we might even have a whole new race.

But all of this is driven by the drive to destroy each other, and each of us should ask ourselves, is it the machines that are going to war, or is it us?

Thank you. (Applause)

Silicon Valley and the Internet gave me superpowers, tools to fight, bulletproof clothing, and a signal to light the skies when it was time to fight.

However, I cannot prove this.

I'm not a "scientist" and I don't have "corroborating facts".

Actually, my rating on movie review sites is about 50%, so I don't know why I was invited here.

(Laughter) But if I'm going to talk to you about running into a power greater than yourself, I think I'm the right person, because last year, my movie, Crazy Rich Asians! (Applause and cheers) Thank you very much.

And since "connection" is the theme of this episode, and my story is made possible because of the many connections that have happened in my life, I hope that by telling a little bit of my story, I can help someone find their own path faster than I can.

My story began when I opened my scriptures for the first time.

Gadget Scripture "Sharper Image" Catalog

(Laughter) Those who know me will understand.

It's a magical magazine full of dreams, and it's full of things that you would never think possible.

You can also order online

Some were better off without it, like Gregory, a realistic, portable mannequin that claims to deter crime with a stern look.

It's really -- (Laughter) it's real.

(Laughter) But what really caught my eye was Sima Video Ed/it 2.

It looked so cool to my 10 year old eyes

I can hook it up to a VHS player and edit videos, so I called my parents and begged them to buy it for me.

Before we get to that, let me tell you a little bit about my parents.

My parents came to the United States when they were young. They are from Taiwan and China. They settled in Los Altos, California -- Silicon Valley before it became Silicon Valley -- and they started a Chinese restaurant called "Chef Chu's Restaurant."

Half a century later, my parents still run the store, and I'm still in the same place.

Speaking of ties, this place was the center of ties.

People come to celebrate birthdays, anniversaries, contracts, and drink and eat and bond.

i grew up in it

My parents always said America was the best place in the world.

If anyone has something they like, they can make it come true by working hard

My parents raised us five children as Americans.

I'm the youngest and I'm the one with the eyes closed. My sister is Jennifer.

(Laughter) That's how much my parents loved America.

I used to think that we were like the Kennedys, especially my mom, so I would often dress my kids in matching outfits, send them to etiquette lessons, ballroom dancing classes, and get their teeth straightened. (Laughter) Here's a picture of me.

this is terrible

I was in charge of taking videos during vacation trips, so I had a lot of videos I had.

So Sima Video Ed/it 2

I managed to convince my parents to buy it for me, and I collected all the video recorders in my brother's and sister's rooms, hooked them up all night, tangled up in cords, and spent the night making something I could show them.

I gathered my family in the living room one night, I think it was 1991 or so, and I sat them down in the living room, my heart was pounding, I was breathing deeply, like now, and I hit play, and something amazing happened.

everyone cried

i was crying all the time

It wasn't that my family cried because it was the best home video of all time, it was certainly good -- (Laughter) but it was because they saw their family as a normal family on the screen, like their favorite movie or TV show with a child's name.

As the youngest of five children, I felt like my opinion was being heard for the first time.

There was this place where the ideas swirling around in my head were going into and out of this big electronic space. And from that very moment, I knew I wanted this to be my life's work.

when my father goes to work

I used to brag about my home video editing skills to restaurant customers, fortunately in Silicon Valley, where they were engineers working on hardware and software.

It gave me everything I needed for digital video editing.

It was in the mid-'90s or earlier, so it wasn't something a child would use.

We've got Russell Brown beta software and hardware from HP and Sun and Adobe.

There's no manual.

I went to the University of Southern California's School of Cinematic Arts, and my father and mother called me on the spur of the moment, telling me that I had to make a film about your Chinese heritage.

China will one day become a major market for the film industry.

I was like "yes yes"

(Laughter) Listen to your parents.

(Laughter) I was aiming for Zemeckis and Lucas Spielberg.

I didn't even want to deal with my own cultural background or ethnicity.

In fact, I had no one to talk to, no one in college I could talk to openly.

So I ignored it and moved on with my life.

Fast forward 15 years later, I was in Hollywood.

Found by Spielberg, worked with Dwayne Johnson, Bruce Willis, Justin Bieber.

I went on stage at TED to introduce my dance company, LXD, and it went really well.

But a few years ago, I kind of got stuck creatively.

The engine ran a little rough, and I got the signal.

I heard a voice from the sky

more like a chirping than a voice

It's Twitter

On Twitter -- (Laughter) -- Constance Wu, Daniel Dae Kim, Jenny Yang, Alan Yang, who's also here, all these people were complaining about Hollywood's racial bias.

i was startled

I felt it, but I didn't realize it. I was lucky enough to be able to focus and work. But then I realized, what is Hollywood doing?

why don't you fix it

And when I looked at myself in the mirror, I realized that I was on the Hollywood side, too.

Literally, I'm in Hollywood to the point where I put my collar up before I went on stage.

(Laughs) Are you still standing? good

(Applause) I've been given so much, and I've always wondered what I was giving back to the film industry.

I was really lucky, but then I realized that it wasn't just luck that got me to work here. I deserved to be here.

I have won my qualification

I didn't have time to sleep, I didn't go to parties on Friday nights, I worked all the time, I edited videos, and I lost friends and girlfriends.

It's scary to tell your own story and to tell stories about people who are like you and your family.

But the internet has taught me that there are many allies waiting for me, supporting me and loving me.

So I came across Kevin Kwan's wonderful novel, "Crazy Rich Asians," and I decided to do this.

I made a movie

All-Asian cast -- the first modern all-Asian cast in 25 years.

There are no free tickets to these movies.

Every time we did market research, we found that customers weren't coming in.

Even the test screenings that actually give out free tickets, even the test screenings that actually give out free tickets, the rate was 1 in 25. You give out 25 people and then one person shows up.

Asians who knew the novel didn't trust Hollywood, Asians who didn't know the novel thought the title was disrespectful, and non-Asians thought the movie wasn't for them.

it was quite a predicament

Fortunately, Warner Bros. didn't abandon us.

And then something else happened in the electronic space, and many Asian-American writers, reporters, bloggers -- people who had made their mark in their respective mediums over the years -- helped me without my knowledge.

Started various posts

Tech founders here have also posted on social media, written about the film for the LA Times, The Hollywood Reporter, and Entertainment Weekly.

It was like a grassroots movement to make themselves news.

it was really a wonderful sight

A surge of support led to an online dialogue, a discussion and discussion among Asian Americans about what story they wanted to tell, what they should tell and what they shouldn't, and was there self-deprecation? What about casting?

what is allowed?

We didn't agree, and we don't, but that's not the point.

The very fact that the conversation happened was important.

The flow of dialogue became the infrastructure

It's become an interconnected organization of different groups who want to accomplish the same thing.

It's not perfect, of course, but it gave us a starting point to decide how we wanted to portray ourselves in the film.

When I went to the movie theater, I felt a stronger sense of reality.

I'll never forget that opening weekend. When I walked into the cinema, there were people of all kinds, not just Asians, and when I sat down, the audience laughed and cried.

Like I don't want to go home yet

We were hugging each other, giving each other high fives, taking selfies, arguing, laughing.

there were various reactions

This movie was very close to me, but I didn't really understand what we were making until it came out and something like that happened.

Seeing ourselves on screen is a powerful experience, one that I can only describe as a source of pride.

You've always known this in your head, you've probably said it, but the real feeling of pride, as anyone who's ever felt it, is that you just want to touch and grab people and run around.

It's a very, very inexplicable feeling that comes up in your body, and it's all about long, long connections.

Movies have been a gift to me and I've learned a lot over the years.

You're planning, you're writing the script, you're storyboarding, and at some point there's a moment when your movie speaks to you, and you have to listen to it.

Movies are living things, they make a statement, and you have to catch them before they slip through your grasp. That's the beauty of filmmaking.

If you think about life, it's actually pretty similar.

It could be people, it could be circumstances, it could be luck.

Things changed when I realized that when I started listening to the quiet moments and the noise around me, there was a beautiful symphony made just for me.

It's a path that stretches straight to your destiny

my super power

Movies were a gift to me, inspired by my parents and supported by the community.

I was able to become who I wanted to be when it was supposed to be

My mother posted something on Facebook the other day, and it's something that most of us would be embarrassed to say aloud, and I don't think you should be on Facebook.

As I was putting the finishing touches on this talk, I realized that all the strong connections that have happened in my life have been due to tolerance, kindness, love, and hope.

"Crazy Rich! or the in-progress "In the Heights."

I only think about expressing joy and hope, because I don't want to think that the good times are over.

Because love - love is the superpower I've been given

love is my inherited superpower

Only love can stop an accelerating bullet before it leaves the gun.

Love is the only thing that can easily leap over buildings and keep everyone in a community looking up into the sky, and that gives us the courage to hold hands and face something much bigger than ourselves.

I have homework for everyone here and myself.

When you're working on your cause or your company, let's bring things to life and let's remember to be kind to one another as we try to make the impossible possible, because that's the most powerful bond we can have in the world.

our future depends on it

thank you

(Applause and cheers) Thank you.

(applause)

And one thing I would like to say about making this film is that when you listen to Michael Motion and these wonderful talks about music, there's a narrative flow to it, and music exists in time.

Movies also exist in time and are experiences to be experienced emotionally.

I felt that every documentary I've ever seen in the making of this film is ultimately about learning, driven by actors and ideas.

In contrast, this film wanted to follow my journey, driven by emotion.

So instead of having actors talk and set up scenes, we're going to meet different people in sequence.

they appear only once

It will never appear again, so it can be said that it is truly a record of the journey.

It's like life, once you get in, you can't get out.

There are two scenes that I want to show you.

It's actually included in the larger scene in a different way of appearing.

they are in perfect harmony

And then there's a short scene of my father, and he talks about something that's important to him, an accidental event in his life.

I think he felt that the best things in life happened by chance, not planned.

And after the scene with the three of them, there's a building in Dhaka, Bangladesh, which for me is my father's masterpiece.

my father built the parliament building in dhaka

It's the first time it's been used to shoot a movie, so I hope you enjoy looking at the building.

We were the first film crew there.

I'll show you a video of that magnificent building.

The thing to keep in mind is that everything was built by hand, and it was only last year that we started using cranes.

It was built entirely by hand on bamboo scaffolding, and they carried concrete baskets on their heads and poured them into the formwork.

Bangladesh's parliament building took 23 years to build, and they look very proud.

It took as long as the Taj Mahal to complete.

Unfortunately, my father never saw the finished product.

father died in 1974

This building was completed in 1983

So construction continued for years after my father's death.

What I want you to think about while watching the video is that sometimes in life you can't see the end of what you're striving for.

What struck me about my father was that he had a belief that something good could come out of doing things like this in his own way. There was a period of war with Pakistan, and construction was halted, but he continued working because after the war, the people of Bangladesh would need this building.

I'll show you two scenes.

please start

(Applause.) R.S. Worman: I still remember his lectures at the University of Pennsylvania.

I came home and said to my parents, ``The person I met today has a strange voice because he doesn't have a lot of work, but he's a university teacher.

I don't think you've ever heard his name But he'll be famous one day Please remember this day He's just a great man

Frank Gehry: I heard he had a fling with Ingrid Bergman, is that true?

Nathaniel Khan: If so, you're a lucky man.

(laughs) Khan: Did you really hear that?

Gary: Yeah, when he was in Rome.

Moshe Safdie: He was a true wanderer

When I was active he came back from his trip and came to the office He worked hard for a few days and then went on a trip again

I used to work with him until 3 a.m. He had a vagabond feel

Nothing is more tragic than dying at a train station, but it really tells the story of his life.

I often think about dying on a plane, at an airport, or dying unidentified while jogging.

I don't quite understand why the memory of him dying haunts me.

he was a wanderer at heart

Louis Kahn: How haphazard our existence is, how much we are influenced by circumstances.

Man: I take a walk here every morning And enjoy the beauty and atmosphere of the city This is the nicest place in Bangladesh

I'm proud of this building

Are you proud?

Yes, because it is the image of the country of Bangladesh.

What do you know about architects?

architect? I've heard of architects

I came here because I'm his son, he's my father

Is Louis Farrakhan the father?

It's Khan not Farrakhan

oh yeah louis kahn

(laughs) Dad! Are you alive?

passed away 25 years ago

I'm very happy that you're here.

thank you

my father couldn't see the end

i died before i saw it

Shamsal Wares: It was nearly impossible to build for a country like ours

Fifty years ago there was nothing but paddy fields, and I called him here, so he felt responsible.

He wanted to be Moses here and gave us democracy.

He's not a politician, but he created a democracy from where we can stand.

It's very relevant in that way.

He didn't care about the wealth of Bangladesh or whether he could finish this building, but he did.

This is what he did in the poorest country in the world

he sacrificed his life

Well, he spent his life for this, and we will never forget his greatness.

but he was human too

It's inevitable for great men to fail to satisfy their family's life.

But I don't think his son understands this and doesn't think he resents his father or thinks he's been ignored.

His way of caring was very strange, but it took me some time to figure it out.

The social side of his life was like that of a child.

He couldn't say no to anything, and that's why this building exists today.

You can only understand him this way

There is no other shortcut or way to truly understand him.

But we will always feel him because he gave us this building, and this is how he gave us his love.

I'm sure I couldn't give you the right love, but you gave us the right love That's the important thing

you have to understand

he had a lot of love and he loved everyone

In order to love everyone, he sometimes didn't spend time with the people he truly loved, and it's only natural for a man as brilliant as he is.

(applause)

When we decoded the human genome in 2003, we thought we might have answers to cure many diseases.

But the reality is far from that, because in addition to our genes, our environment and lifestyle can also play a significant role in many major diseases.

One example is fatty liver, which affects more than 20 percent of the world's population, has no cure, and leads to liver cancer or liver failure.

So sequencing DNA alone does not give us enough information to find effective treatments.

On the bright side, there are many other molecules in the human body.

In fact, there are over 100,000 intermediate metabolites.

Intermediate metabolites are molecules that are very small in size.

Some of the known examples are glucose, fructose, fat and cholesterol, which we hear all the time.

Intermediate metabolites are involved in our metabolism

And because it's also under the control of your DNA, it carries information from both your genes and your lifestyle.

Understanding intermediate metabolites is essential to finding cures for many diseases.

I've always wanted to treat patients.

And yet, 15 years ago, I dropped out of medical school because I couldn't let go of my passion for math.

Shortly after that, I realized something wonderful: that we could use mathematics to do medical research.

Since then, I've been developing algorithms for analyzing biological data.

It seemed simple enough: collect data on all the intermediate metabolites in the body, develop a mathematical model of how they change in disease, and then intervene in those changes for treatment.

And I realized why no one had ever done this before, because it's so difficult.

(Laughter) Our bodies have many intermediate metabolites.

everything is different from others

For some intermediate metabolites, mass spectrometry can be used to determine molecular weight.

But sometimes there are 10 different molecules with exactly the same mass, and it's hard to know what they are, and if we want to identify them all, we need more experiments, which can take decades and billions of dollars.

So we built a platform for artificial intelligence, or AI, to do just that.

We've taken advantage of the growing body of biological data to build a database of all existing information about intermediate metabolites and their interactions with other molecules.

We put all this data together in a meganetwork.

Then we measure the masses of intermediate metabolites from the patient's tissues and blood to see how much of the intermediate metabolites change during the disease.

But as I said earlier, we don't know exactly what they are.

It could be glucose with a molecular weight of 180, it could be galactose or fructose.

They have exactly the same mass, but they have different functions in the body.

Our AI algorithms take into account all these ambiguities.

And we're going to explore meganetworks to find out how these intermediate metabolites interact to cause disease.

Depending on how they are connected, we can infer the substance from the mass of each metabolite. For example, this 180 molecular weight could be glucose. More importantly, we can understand how changes in glucose and other metabolites lead to disease.

Our new understanding of the mechanisms of these diseases will enable us to find effective treatments that target them.

We're building a startup company to bring this technology to market and impact people's lives.

Currently, my team and I are working at ReviveMed to find treatments for important diseases in which intermediate metabolites play a major role. In the case of fatty liver, it is caused by accumulation of fat. Fat is one of the intermediate metabolites present in the liver.

As I mentioned earlier, fatty liver is prevalent and there is no cure.

Fatty liver is just one example.

And we're working on hundreds of diseases for which there are no cures.

As we continue to collect data on intermediate metabolites and understand how changes in intermediate metabolites lead to the development of disease, our algorithms will become smarter to find the right treatment for the right patient.

This brings us closer to our goal of using AI to efficiently save lives.

thank you

(applause)

Malaria is still one of the leading causes of death worldwide.

Our efforts over the last 20 years have made a huge difference, but half the world's population is still at risk of malaria.

In fact, every two minutes, a child under the age of two dies from malaria.

It is clear that countermeasures have been difficult

There are many problems in tackling malaria, one of which is how to identify people with malaria in the first place.

For example, a person with some degree of immunity to malaria may become infected and become contagious but not exhibit any symptoms at all.

It's a difficult task, like threading a needle through the dark night.

Scientists have been grappling with this problem for years, but today I want to tell you that the solution may actually be right under your nose.

Now, I'm sure you've been feeling overwhelmed with all the important stats from the beginning, so let's relax together for a moment, and I think I'll be a little less nervous.

Take a deep breath, take a deep breath...

(laughs) Take a deep breath... Oops, I feel like I'm going to be blown away.

Let's try again, but this time take a deep breath, just through your nose, and feel what's going on around you.

Not only that, try sniffing the odors of your neighbors as well.

It's okay if you don't know each other

Here, boldly push your nose into your armpit.

(Laughter) Each of you must have felt something completely different.

Some people may think that it smells good, like the scent of perfume.

On the other hand, some people may have felt uncomfortable, such as someone's bad breath or body odor.

Some of you may have smelled your own body odor.

(Laughter) I think there's probably a reason why some people don't like certain body odors.

Historically, there have been many illnesses associated with odors.

For example, it is said that typhoid fever smells like baked black bread. It smells pretty good, doesn't it?

It is said that tuberculosis smells like stale beer, yellow fever smells like a butcher's shop, and raw meat.

And if you look at the words used to describe disease, the most commonly used words are "rotten," "rotten," "smelly," and "irritant."

So, of course, odor and body odor have a bad reputation.

No one takes it as a compliment when they say "smell"

But, as you can see from the previous experiment, people do have odors.

this is a scientific fact

But turn this around

Capture the smell as a plus What if you could use it? By detecting the chemicals your body gives off when you're sick,

What if it helps with diagnosis?

You'd think we'd have to develop high-performance sensors to do that, but there's a really good sensor that already exists, and it's called an animal sensor.

animals have a natural sense of smell

I live by my nose

We get a sense of our surroundings and obtain important information.

Now imagine that you're a mosquito, and you enter the building from the outside and enter this venue.

It's a very complicated world here

Various odors come from all directions

As I just experimented with, humans have a strong odor.

The volatile chemicals produced are different for each person.

There are so many types of body odor that it is impossible to put it all together.

It's not just people, it's the seats in the venue, the carpet, the carpet glue, the wall paint, the trees outside.

Everything around you is giving off odors. Mosquitoes fly through a very complicated world, and they have to find you in this complicated world.

Let me ask you a question that we all know the answer to. Raise your hand if you are prone to mosquito bites.

So who doesn't get stabbed?

There is always one or two hateful people who have never been bitten by a mosquito.

Mosquitoes have a hard time finding you because they have no choice but to smell you.

People that mosquitoes don't like smell bad.

(Laughter) What we now know is that genes control this.

Mosquitoes choose people because they have a very good sense of smell, and they can pick up a mess of odors.

Now what if one of you had malaria?

Let's start by looking at the life cycle of malaria.

It's pretty complicated. Basically, mosquitoes only transmit malaria when they bite people.

When a mosquito bites a malaria-infected person, the malaria parasite enters the midgut through the mouth, and when it breaks through the midgut and creates a cyst, the parasite begins to multiply. It then travels from the midgut to the salivary glands, where it is carried with it when it bites the next person, because as the mosquito bites, it injects saliva into it.

And then the next cycle begins in the human body, and the next stage is the liver stage, where it changes shape, enters the bloodstream, and finally becomes contagious.

One thing we do know about parasites is that they're very good at manipulating their hosts.

What about malaria? It's plausible to think that they're manipulating something to do with odor, because in the mosquito world, odor is what

Because it's a clue to find humans

This is the so-called hypothesis of host manipulation by malaria, and it's what we've been working on for the last few years.

One of the first things I wanted to do in this study was whether malaria really makes mosquitoes more likely to come to you.

To do this, my colleagues and I designed an experiment in Kenya, where we have Kenyan children sleep in tents.

Then we sent the odors from the tent into the huts containing the mosquitoes, and we observed how the mosquitoes behaved in response to the odors.

Whether you approach the odor or stay away from it depends on whether you like the odor or not.

There were malaria-infected and non-malaria-infected subjects, and importantly, none of the children had any symptoms of malaria.

I was stunned when I saw the results.

Children with malaria were much more favored by mosquitoes than children without malaria.

Let me explain with a graph

It shows "the number of mosquitoes approaching the child." There are two types of data, pre-treatment and post-treatment.

The left end of the bar graph is the uninfected group of subjects, and as it moves to the right, it becomes more infected and contagious.

Children in this condition have an increasing number of mosquitoes that are attracted to them.

The next step in this research, of course, is to treat the children. After eradicating the malaria parasite, we did the same experiment again, and found that the previous trait of mosquito attraction disappeared after the treatment.

So it wasn't just mosquito-friendly, the parasite was somehow manipulating the host into being liked by the mosquito, making the host stand out and attracting the mosquito so that it could continue its life cycle.

The next thing I wanted to ask was, what exactly do mosquitoes smell and what do they detect?

For this, we need to collect the body odor of the subjects, so we put the subjects' feet in a bag to collect the volatile odors that come out of their feet. Feet are very special to mosquitoes.

Mosquitoes are sensitive to foot odors

(laughs) I especially love cheesey feet. Anyone with cheesey feet?

It's an irresistible odor for mosquitoes.

That's why I focused on the feet and collected body odors.

When it comes to mosquitoes and their sense of smell, a mosquito's sense of smell is very complex.

It would be nice if we could only detect one chemical, but that doesn't work.

Mosquitoes have to detect many chemicals in the right concentrations, ratios and combinations.

It's kind of like a song

If you make a mistake with the notes or change the dynamics, things go wrong.

Or something like a recipe, if you use the wrong ingredients or the cooking time is too long or too short, you won't get the flavor you're aiming for.

It smells the same

It's only when the right set of chemicals are combined that you get that smell.

Our lab equipment isn't very good at distinguishing these complex signals.

But animals do have this ability, and that's why we're doing this in the lab by attaching microelectrodes to mosquito antennae.

It is a work full of tension

(Laughter) And it connects to each of the cells that make up the sense of touch, you won't believe it.

Of course, sneezing is prohibited during this experiment.

By doing this, we'll be able to measure the electrical response of the olfactory receptors in our sense of touch, so we can visualize what the mosquitoes are smelling.

let me show you what it looks like

Here's a bug cell, and when I press this button, it immediately starts reacting, and at first you see a sparse wave.

When you spray the odor on the cells, the reaction becomes so intense that it turns into a vibrating buzzing sound, and when you turn off the odor, it returns to its resting potential.

(High-paced reaction sound) (Low-pitched roaring sound) (High-paced reaction sound) It's something like this. Now you can brag to your family.

Now we know what mosquitoes are detecting.

By testing my malaria samples in this way, I was able to determine what the mosquitoes were detecting. I was able to identify the compounds that differentiated malaria, mainly aldehydes, a group of malaria-signaling odorant compounds.

This is what malaria smells like, and we've used mosquitoes as biosensors to figure out what malaria actually smells like.

Imagine if you could attach a harness-like belt to a tiny mosquito, tether it to a string, and let it sniff you while you stroll down the street? So sometimes I wonder if I could actually find a malaria patient, if I could do an experiment, which is, of course, not realistically possible.

But there was an animal that could make this idea a reality.

Dogs have a very keen sense of smell, and an even more important feature is their ability to learn.

As you all know, with this concept, at airports, people in line and luggage are sniffed by dogs for drugs, explosives, even food.

So I wanted to know if we could actually teach a dog to smell malaria.

We're working with a charity called Medical Detection Dogs to train dogs to smell malaria.

To do this, we went to The Gambia to collect more odors, from infected and non-infected children, and this time, to collect the odors, we asked the children to wear socks and stockings to collect their body odor.

I brought these socks back to the UK and gave them to this organization for testing.

I could show you a graph here to explain how the experiment worked, but that would be a little boring, wouldn't it?

We've been told to avoid live appearances with children and animals, but today we're breaking that rule.

Now let's get you on stage. It's Freya.

(Applause) And our trainers, Mark and Sarah.

(Applause) The real star today is, of course, Freya.

(Laughter) Now, I have a request for all of you.

This place is a completely unfamiliar environment for Freya.

I'm so worried about you

So please be as quiet as possible.

Now, what Freya is going to do is have her walk in front of a line of devices, each of which contains a container, and each container contains a pair of socks from a Gambian child.

Three socks were worn by children who did not have malaria.

Now imagine this is the line of people you see at the airport, where the dogs take turns checking for odors.

Let's see how Freya can detect malaria, and see if it can detect it.

Freya has a very special environment, so it's a very difficult test.

(laughs) Third.

(Applause) It's like this.

Neither I nor Mark know which container was correct.

It's a true blind test Sarah Was it the right box?

(Sarah) yes

You were right Freya Well done! Excellent work

(Applause) It was really beautiful.

Now, I'm going to ask Sarah to switch containers, remove the malaria-scented socks, and now use only the socks of children who aren't infected with malaria.

And that's also very important, because we also need to identify uninfected people, so we have to be able to do that as well.

doing something very difficult

It's a sock that's been in the freezer for two years, and I'm using a little piece of cloth that's been cut from that.

Unlike when you sniff a person, you don't get obvious cues.

It's amazing

Mark please

(Laughter) (Applause) Well done, great.

(Applause) Freya, Mark and Sarah, thank you. Please give a big round of applause.

it was brilliant

(Applause) You're really good, you should get some treats later.

it was great

What I'm showing you now is

It's a genuine live performance I was nervous too

I'm really glad it worked out

(Laughter) This is really amazing. So far, sniffer dogs can correctly identify people with malaria 81 percent of the time.

extraordinary

92% of non-infected people can be identified correctly.

Both of these numbers exceed the diagnostic criteria set by the World Health Organization (WHO).

We're seriously considering putting dogs in countries, especially at ports of entry, so that they can detect people with malaria.

The day may come when this becomes a reality

On the other hand, dogs cannot be placed anywhere.

For example, you could put a patch on your skin that would change color if it detected a malaria infection in your sweat.

Or maybe something a little more high-tech, like a smartwatch that can tell you if you have malaria.

What if we could digitize this and collect data? Imagine the amount of data that can be collected on a global scale

We may be able to track disease transmission, to develop preventative measures, to respond to outbreaks in ways that have never been done before, and have the potential to ultimately contribute to the eradication of malaria, not just malaria, but any other disease we know to smell.

If we can use the power of nature to identify odors, we can do the same.

As scientists, our mission is to find new ideas, new ways of thinking and new technologies to tackle the world's biggest problems. It always amazes me, but nature often teaches us the solutions.

it was right in front of my nose

thank you

(applause)

I'm so excited to be on this stage just to be able to see what's about to begin.

That being said, what is our brain's greatest desire?

Let me show you instead of explaining

because i want you to feel

In the next 14 minutes, there's a lot I want you to feel.

can you all stand

Let's conduct the music of Richard Strauss together

It's a song you know

Are you ready?

(Audience) Yes

(Bo) Then Mr. One!

the beginning part

(Symphonic poem "Thus spake Zarathustra") See, you know

(music) It's going up

(Song suddenly cuts off) Ah!

(laughs) Right?

It's been a while

you can sit

(Laughter) We deeply crave completion.

(Laughter) I like to settle.

(Applause) There's an anecdote about Mozart.

The father, who was already in bed, just said, "Exactly!"

You said you couldn't sleep until you got up and played the last note of the chord

(Laughter) And this desire to settle makes us wonder what we fear most.

What was your greatest fear when you were a child or still feel now?

it's the fear of the dark

we hate uncertainty

i hate not knowing

i just hate

think horror movies

When it comes to horror movie scenes, it's the darkness, the woods, the night, the depths of the ocean, the darkness of space.

That's because, in evolution, death was an easy thing to come.

If you don't realize it's a predator, it's too late.

the brain evolved to predict

If you can't predict it, death awaits.

And the brain makes predictions based on preconceptions and assumptions that were once useful.

Those assumptions aren't just in your brain,

projected into the outside world

no birds here

You're projecting meaning onto the screen.

What I'm saying right now literally makes no sense

(Laughter) You create meaning and project it onto me.

What is true of things is also true of people

"What" and "When" can be measured, but "Why" cannot be measured

So color the other people

You project meaning onto others based on your own preconceived notions and experiences.

So the best designs are usually those that reduce uncertainty.

When you step into uncertainty, your body responds physiologically and psychologically.

weakens the immune system

brain cells weaken and even die

Decreased creativity and intelligence

Fear often turns into anger

why? because anger is a certain state

Easier to make moral criticism

extreme face appears

Conservative people are more conservative

liberal people become more liberal

Because I'm trying to go to the familiar

The problem is that the world changes

If you don't adapt, you will die.

The first step to change from A to B is not B

First, going from A to non-A is letting go of our preconceived notions and assumptions, stepping into the places our brains have evolved to avoid -- into the unknown.

We need to go somewhere where our brains are giving us the answers.

evolution gave us the answer

it may be the deepest perceptual experience

It's an impressive experience

(music) (applause) (music) (applause) (music) (applause) (music) (applause) (cheers) (applause) Wow, that was great.

I'm sure you're more or less impressed by now.

What's going on in your head?

For thousands of years, humans have thought about, written about, and experienced emotions, but we know very little about them.

To understand what it is and what it does, in my Lab of Misfits, I've had the wonderful opportunity to work with some of the most inspiring makers: writers, creators, directors, accountants -- people from Cirque du Soleil.

We went to Las Vegas and recorded brain activity as we watched performances, and we did this 10 times at Cirque du Soleil's flagship show, "O."

And then I added other people to look at what they were doing before and after the show.

More than 200 test participants

What is an impression?

What's going on in your head right now?

state of the brain

The front part of the brain, the prefrontal cortex, which is responsible for executive function and attention, is now downregulated.

The part of your brain called the default mode network, which spans multiple brain regions, is activated when you're generating ideas, thinking creatively in the sense of divergent thinking, daydreaming, and so on, and it's upregulated right now.

Your prefrontal cortex activity is changing.

There's asymmetry in activity, right-dominance, which is the opposite of taking a step back from the world, and it's related to stepping into the world.

This brain-wide activity was highly correlated between participants, and we were able to train an artificial neural network to determine whether they were experiencing an impression, with an average accuracy of 75% and a maximum accuracy of 83%.

What does this brain state do?

Others have shown, according to Professors Heidt and Keltner, that people feel small and connected to the world at this time.

They also increase their prosocial behavior, because they feel a stronger sense of intimacy with other people.

We also showed in this study that it reduces the need for cognitive control.

Endless uncertainty no longer makes me feel so uncomfortable

Increased appetite for risk

You become more risk-seeking, and you become better at taking risks.

And very essential, when we say, "Are you sure you're impressed?"

After the performance, they were more likely to answer positively than before.

I redefined myself and my history.

Maybe being impressed is recognizing something bigger than yourself.

In the words of Joseph Campbell, "Inspiration is what keeps us going."

In the words of my friend, the brilliant photographer Duane Michaels, who once said to me, "It gives you the curiosity to overcome your timidity."

Why is this important?

Let's think about conflict, which is so prevalent in today's society.

When you're at odds with someone, it's like you're on opposite ends of a line.

I'll show them they're wrong and try to get them to come over here.

The problem is that others are doing the same.

Show me I'm wrong and try to get me to come to your side

In conflict, they try to win, but they don't try to learn.

the brain only learns when it moves

to live is to move

What if impression could be used there? It's not about getting rid of conflict -- conflict is necessary, it's how the brain expands and learns, but rather, it's another way of entering conflict.

What if impression made possible at least two different ways of confrontation?

One is to gain the courage and humility to face the unknown.

Entering conflict with questions rather than answers

What would happen then?

We enter conflict with uncertainty, not certainty.

The other is to enter into conflict seeking to understand, not to persuade.

because we all have something in our hearts

To understand another person is to understand the preconceptions and assumptions that drive their actions.

We've just begun a preliminary study to see if art-induced emotions make people more tolerant.

the results are very positive

Anger and hatred can be tempered by experiencing the emotions induced by art.

Given its importance, where can we find inspiration?

If-

This is just one hint, but inspiration isn't just found in grand things.

Impression is necessary

Sometimes it's the scale, the mountains, the sunset

What if you could change the scale of yourself and find the improbable in the simple?

If this is true and our data is correct, activities like science, adventure, art, ideas, love, TED and performances can not only inspire us with inspiration, but they can also be a ladder to step into uncertainty to expand ourselves.

thank you

(Applause) Please come forward.

(Applause) (Cheers) (Applause)

Scientists use every new piece of knowledge to open the door to the unknown, exploring the path to truth.

Paradoxes are especially fraught with uncertainties and the potential for new discoveries.

Throughout history, what we know to be true has been threatened by paradoxes that have reshaped our understanding of the world.

One of the biggest paradoxes in the universe today threatens our understanding of general relativity and quantum mechanics: the black hole information paradox.

To understand this paradox, we must first define what we mean by "information."

Information is usually what you see.

For example, we understand from this kind of information that apples are red, round and shiny.

But physicists are more interested in quantum information.

So we're looking at the quantum properties of all the particles that make up the apple, such as position, velocity, and rotation.

All matter in the universe is made up of subatomic particles, each with its own unique quantum properties.

This is an important idea based on a fundamental law of physics: that all quantum information in the universe is conserved.

Quantum information doesn't go away, even if you destroy things to pieces.

So, theoretically, by gathering information, it is possible to reconstruct an object from its constituent particles.

Information preservation is not an unfounded law, it's a mathematical imperative upon which much of modern science rests.

But around black holes, that foundation is shaken.

When an apple enters a black hole, it disappears from the universe, and it seems as if all quantum information has disappeared.

But this doesn't mean that the laws of physics are immediately broken.

Information becomes invisible, but it still exists in the void space of the black hole shrouded in mystery.

On the other hand, there's the theory that information isn't even inside a black hole.

From the outside, the apple's quantum information appears to be encoded in the black hole's surface, the event horizon.

As the mass of a black hole increases, so does the surface area of ​​its event horizon.

So it's possible that when a black hole sucks in an object, it grows so large that it can store quantum information about that object.

That said, whether information is stored inside a black hole or on its surface, the laws of physics still hold. But Hawking radiation doesn't.

In 1974, Stephen Hawking put forward the theory that black holes are slowly evaporating.

Over a tremendously long period of time, the black hole shoots particles out of the event horizon and loses mass.

Rather, Hawking proposed that the evaporating particles have nothing to do with the information that the black hole encodes—that is, the black hole, along with all the quantum information it possesses, could completely evaporate.

Will quantum information really disappear?

Where are you going if you can't disappear?

Evaporation takes an incredibly long time, and it poses a pressing problem in physics.

When information is missing, we need to reframe our basic scientific thinking framework.

But fortunately, in science, paradoxes are also opportunities for new discoveries.

Researchers are now examining a variety of possible solutions to the information paradox.

One researcher argued that information is encoded in the radiation a black hole emits, but how it's done is unknown.

Others argue that the information paradox arises from a misunderstanding of the relationship between general relativity and quantum field theory.

General relativity and quantum theory each describe the maximum and minimum physical phenomena, but it's very difficult to integrate these theories.

Furthermore, some researchers argue that solutions to the information paradox and many other paradoxes inevitably lead to a "theory of everything".

Developing the theory that the two-dimensional surface of the event horizon can store quantum information, the holographic principle suggests that the end of the "observable universe" is a two-dimensional plane in which information about real three-dimensional objects is encoded.

If this is true, it's possible that the reality we know is nothing more than a holographic projection of information.

Even if either theory maintains the current model of the universe and resolves the information paradox, it will raise new questions to explore.

But it's also possible that the current model itself is wrong.

Either way, the information paradox propels us forward into the unknown.

What I want to talk to you about today is how to make predictions, and an example of this is predicting what Iran will do in the next two to three years.

Science can help us make effective predictions.

The reason we use science is that we can reuse our predictions. Science is not just wisdom and predictions.

If we can predict, we can create the future

If you're an energy policy maker, or a national security maker, or a health policy educator, the science that specializes in predicting can help you, much more than the kind of intuition and experience we've been using.

Before I explain how to use science, just a little preamble: I don't use magic.

There are areas that are predictable using this technique, and areas that are completely unhelpful.

The techniques I'm going to introduce can be used widely in situations involving complex negotiations and power dynamics, in politics and in business, but on the other hand, they can be used for stock speculative purposes.

I don't do stock predictions

I don't even predict randomly generated numbers

In fact, some people call me and ask me what lottery number they won.

I have no idea

My specialty is game theory, and although game theory is a branch of mathematics, it can also be applied to the study of politics.

Politics is no longer a matter of speculation; it should be analyzed with a stern eye.

So what is game theory?

Game theory assumes that people think what's convenient for them.

The fact that we are selfish is a controversial topic, but not surprising.

People have values ​​and distinguish between what they want and what they don't want, in order to determine what is best for them or what is best for them.

Also, what other people want, what they don't want, how much power others have, and how much they can interfere with what they want.

People will have limitations, constraints, weaknesses, and they may live in the wrong place. If someone like Einstein lives in the countryside of India and is a poor farmer, no one will notice.

So who is rational?

What do most people consider rational?

Rationality What is a consistent person?

Mother Teresa she was rational

Even terrorists are rational

most people are rational

I think there are only two exceptions. Two-year-olds aren't rational. They have fickle tastes and change their minds all the time.

Most people try to consistently do what's convenient for them.

Now let's consider who has the power to figure out what actions people take to satisfy their desires.

If you want to protest against a company that emits pollutants, the usual way is to push them to do better and explain how the company is destroying the planet.

Many of you will find that this approach doesn't have as much of an impact as you'd hope.

But when companies explain it in relation to what they care about, they respond.

That is, identifying the people who have influence on the issue.

When you look at Iran, you think the President of the United States has a lot of influence. Yes, the President of the United States has influence over Iran, but it's not enough to focus only on the people at the top of power, because the president himself doesn't know the details of what's going on in Iran, neither on energy policy, health care policy, or anything else.

the president is surrounded by experts

It could be the secretary of state, the secretary of defense, the director of national intelligence, the ambassador to the United Nations, or some other official who is familiar with security issues.

But even the secretary of state doesn't really know much about Iran.

So does the Secretary of Defense.

And these key ministers also have experts who advise them, so they can advise the president.

Because there are so many people involved in decision making, to accurately predict things, we need to pay attention not just to those at the top of decisions, but to everyone who has the power to influence the outcome.

Unfortunately we usually don't

There's a very good reason: game theory and computers can overcome the limitations that only a few people at the top can analyze.

Consider a situation where there are five decision makers

For example, here's Sally, and she wants to know what Harry, Jane, George, and Frank are thinking, and she's giving them her opinion.

Sally gives her opinion to the other four, and they give their opinion to Sally as well.

But Sally wants to know what Harry said to the other three, and what the other three said to Harry.

And Harry wants to know what the other four have said to each other, and Sally wants to know what Harry thinks about what the others have said.

this is complicated too much to know

So many correlations with only five decision makers, 120 in total. Do you remember factorials?

The factorial of 5 is 120

Some people may be so good at memorizing 120 things, and that's admirable.

Let's double the number of influencers to 10.

Is this doubling the amount of information we need to know from 120 to 240?

no then ten times

how about 1200 no

The correct answer is 3.6 million

no one can remember

But computers can remember. Computers don't need breaks, they don't need vacations, they don't need a night's sleep, they don't ask for a raise.

Computers store information in an organized way, so we can do predictive analytics.

I'm going to show you how to do predictive analytics, and I'm going to show you some predictions, using Iran as an example.

“Why should I believe what this person says?”

let me tell you another fact

Here's the CIA's analysis of the uncertainties in the future, where my theory popped out the right predictions, while the experts themselves who provided the input data were wrong 90% of the time.

This is the CIA's view, edited from a previously released statement by H. Bradford Westerfield, published by Yale University Press.

What information do we need to make predictions?

You'd be surprised if I said you don't need that much information.

It's the parties involved in the decision that need to be known.

You need to know ``what they claim to want'', not ``what they really want'' or ``what they think is available''. "What they say they want," because that's their strategic view, and from that we can infer important factors in their decision-making process.

What we also need to know is how much attention they are paying to the problems they face.

It's whether or not they take action to deal with the problem, to the point of interrupting their other work when a problem arises, the importance of the problem they face.

The next thing I want to know is how much influence do you have on the problems you face?

Knowing these things allows us to predict their behavior, and everyone looks at two things when they're making a decision.

They care about results They want to get the results they want whenever possible

They also want to be successful, so they want to take credit for the outcome. Ego is also involved.

We have to figure out how to balance these two.

People wonder how much they should stick to their own predictions of outcomes. Those who naively believe in their predictions and achieve spectacular, glorious results.

Many people fall somewhere in between, and once you know their final point of view, you can frame your negotiations and change their behavior.

So, with limited information, we can analyze what options people have, what options they have, what they want, what they value, how they treat others, and so on.

As you may have noticed, we don't have to consider the thought process.

The process that led to the final decision is important in shaping the input information, but if you know your current perspective, you can predict where it's going.

Past history is not very important for prediction.

90% accuracy speaks for itself

So where do we get the input information?

The Internet, The Economist, The Financial Times, The New York Times, U.S. News & World Report, and others are sources of information.

If you don't know who the people who influence decisions are, how much influence they have, how much they care about the issue, what they want, they're not experts.

Let's turn to Iran

I'm going to make three key predictions, and time will tell if they're right.

Will Iran continue to develop nuclear weapons?

How secure is Iran's theocracy?

What will Iran's future look like?

And our colleague President Ahmadinejad, what will happen to him?

What will happen to him in the next year or two?

See this This graph is not statistical

To be clear, this is not a future prediction based on historical data.

We used the views of the stakeholders as input data and analyzed it with a computer program that modeled the mutual dynamics of the stakeholders.

The bottom of the vertical axis isn't zero, so I've narrowed the scope by showing only the predictions, while there are many options.

The top of the vertical axis is the production of nuclear bombs.

Level 130 is halfway between making nuclear bombs and making nuclear bomb fuel.

According to my analysis, here's Iran's position in early 2009.

It is a future prediction by an analysis model

115 is only producing fuel for nuclear bombs This means that although they have learned how to produce nuclear weapons, they do not actually produce them.

You can achieve national prestige, but you can't build weapons.

100 is the construction of a civilian nuclear power plant, which they claim is the ultimate goal.

The yellow line is Iran's most likely future

This is the result of a comprehensive analysis of the views of 87 decision makers in Iran and many foreign parties who are trying to exert influence over Iran.

The white line is what happens if we assume that the international community is no longer involved at all and that decisions are made solely based on Iran's domestic political pressures.

It's an unrealistic assumption, but you can see that the white line, which shows Iran's own intentions without pressure from the international community, moves below the yellow line.

Either way, by the end of 2009, early 2010, things will be stable and balanced.

That balance is never what the United States wanted, but it's quite acceptable, and it's a result that other nations can accept.

As an opportunity to boost its national prestige, Iran can claim that it has acquired the technology to manufacture the necessary amount of fuel for a nuclear bomb without actually manufacturing a nuclear bomb.

How was this prediction derived?

This is the policy forecast for the next two years, favoring civil nuclear development, late 2010 to early 2011, the white bar.

Nuclear bomb fuel development, which currently has little support, will become a major force by 2011, and when you combine the two, you can control your influence in Iran.

Now many people, including Ahmadinejad, want to test nuclear weapons in addition to building nuclear bombs.

This power will disappear completely, no one will support a nuclear test in 2011.

These forces will shrink and flow into other areas, and we can predict that the result will be fuel for nuclear bombs.

Who will be the winners and losers in Iran?

Look at this, the power distribution. They're getting stronger. This chart was made before the current economic crisis.

These people are interested in Iran's economic development, the bankers, the oil people, the market people.

They grow in political influence as religious leaders become more isolated, with the exception of one religious group that is lesser known in America.

And growing this force is what the Iranians call Kietism.

Mostly Qom-based ayatollahs, who are very influential in the religious community, when they see that Iran is going in the opposite direction, the worse, than Ayatollah Khomeini shows, they stop being politically silent and start speaking out louder and louder.

About President Ahmadinejad

There are two things to note. He's weakened. He's getting a lot of attention in the United States, but his presence in Iran is declining.

he is losing his strength

Let's summarize today's talk

You can't predict everything, the stock market is unpredictable, at least to me, but the most complex negotiations are predictable.

Health policy, education, environmental issues, energy issues, litigation, corporate mergers, all these intertwined issues are predictable, and this technology can be applied.

The reason the fact that it's predictable is important is not so much that you can make a lot of money in hedge funds, but because if you can predict what people will do, you can react to it and encourage them to do something else.

If we can do this effectively, we should be able to change the world and get better results.

I would like to say one last thing, and that is an important theme of this event, and an important theme when thinking about the world.

If someone says, "That's impossible," reply, "Are you confusing 'that's impossible' with 'I don't know how to do it?'" Thank you.

(Applause) I have one question.

Really it was interesting

i love this theme

But along the way, I got a little uneasy. Does this model also take into account the possibility that the results will change even more if the predictions are made public?

Because 800 people in Tehran are watching this TED talk.

I thought about that too, and that question came up a lot when I worked for intelligence agencies.

I hope that providing these perspectives will inspire people to have a more careful and serious discussion, because we can direct change in two useful directions.

One, by speeding up the process of people coming to consensus, we can make people less anxious and less time wasted.

Second, I can come to an agreement that everyone is happy with without manipulating people too much, which is my job.

so i think it's a good thing

Are you trying to say, "O Iranians, this is your destiny, go for it"?

I would like to say to the Iranian people that I think the consensus of the Iranian people is pointing in the direction I just mentioned, and that we can get to that situation sooner, and the world will be a better place because we won't be plagued by economic sanctions, and we won't be afraid of the West's use of force.

Thank you very much for today.

thank you

(applause)

i am from detroit

(Applause) In the 1950s, Detroit was one of the world's largest industrial cities, with a population of 1.8 million people, 360 square kilometers of infrastructure, and a prosperous core city in the American Midwest.

And now, just 50 years later, Detroit has become a symbol of urban decay.

Today, Detroit has fewer than 700,000 people, 84 percent of whom are African-American. After decades of investment withdrawal, asset flight from the city to the suburbs, and Detroit's scarcity.

There's a shortage of outlets, especially fresh produce retailers, and as a result, 70 percent of Detroiters are struggling with being obese or overweight.

Getting the nutritious food we need is a nuisance.

For too many Detroiters, fast food restaurants, convenience stores, and gas stations are closer to home, so they're forced to buy their groceries there.

This is not a good situation for Detroit, and this is the situation and the state of affairs that the people of Detroit are trying to change.

no let me restate

Detroiters are really changing this, and they're doing it through urban farming and food entrepreneurship.

Here's what it says: Because of Detroit's recent history, the city of Detroit has a very unique set of assets, including vacant lots.

Experts say Boston and San Francisco Manhattan all fit in downtown Detroit

And they point out that a whopping 100 square kilometers of urban areas are vacant land.

It's about one-fourth to one-third the size of a city, and with so much open space, it creates a landscape unlike any other big city.

Detroit has this: vacant land and fertile soil, proximity to water sources, a willing workforce and a desperate need for healthy, fresh food.

All of this has sparked a grassroots movement of people, the citizens of Detroit, who are taking their own steps to transform the city from a former US industrial center into an agricultural utopia.

(Applause) Of all the cities in the world, Detroit, Michigan, is well positioned to be the global representative for urban food safety and sustainable development.

Detroit has more than 1,500 -- yes, 1,500 -- gardens and farms are now all over the city.

These lands aren't just growing tomatoes and carrots.

Detroit urban agriculture is all about community, because we grow together.

Land is a place where people mingle

In these lands, we cultivate social bonds and at the same time produce healthy, fresh food for our friends, family and neighbors.

let's see together

Let me give you a little tour of Detroit, and I want to show you what happens when you encourage local leadership, and what happens when you support grassroots movements of people making change in low-income and communities of color.

The first is Oakland Avenue Farm.

It's in the North End of Detroit.

Oakland Avenue Farm is transforming 20,000 square meters of land into a venue that combines art, architecture, sustainable environments and new merchandising practices.

EnglishAnd literally, this is what agriculture looks like in Detroit.

Because of my connection with Oakland Avenue Farms, I organized a dinner with Detroit produce.

At this dinner, I gave people plenty of time and opportunity to take them to the farms, to talk face-to-face with the producers, and then take them around the farms.

Afterwards, you'll be served a meal of freshly-picked vegetables cooked by a chef -- the freshest vegetables from the farm.

this is our activity

We invite people to come to our farms and eat together because we want to change the way people interact with food.

I want you to know where the food you eat comes from.

Now let me take you to the western part of Detroit, the Brightmore district.

Brightmore is Detroit's lower-income neighborhood.

13,000 people live in Brightmore.

They used a block-by-block change strategy.

So the Brightmore area has a 21-block subdistrict called Brightmore Farmway.

A disrespectful, dangerous, and abandoned community has become a friendly, beautiful, and safe farmway—parks, gardens, farms, greenhouses, green spaces.

This well-established community is also recent, and they've bought an abandoned house, an abandoned building that hasn't been repaired and has been foreclosed on.

Friends, family and volunteers removed the bulletproof glass, cleared the land, and turned the building into a community kitchen, a cafe, a shop.

Now there's a place for Brightmore farmers and food studios to manufacture and sell.

It gave people in the community a place to buy healthy, fresh food.

Urban agriculture -- and this is the third example -- can be a way to promote the cooperative model of business.

Did I already tell you about the 1,500 farms and gardens?

A nonprofit organization called Keep Growing Detroit is very involved with those farms.

They distributed 70,000 bags of seeds and 250,000 seedlings last year, and as a result of their work last year, they harvested 250,000 kilograms of crops in the city of Detroit.

(Applause) More than just that, they manage and run cooperatives.

I say Grown in Detroit

It's a cooperative of about 70 small farmers.

They each farm and sell together.

We grow fruit, we grow vegetables, we grow fresh flowers, we grow herbs, all without chemicals, pesticides, fertilizers, in healthy soil, without GMOs - healthy food.

Their produce is sold at local markets around Detroit, and 100 percent of the proceeds go back to them.

In a city like Detroit, too many African Americans are dying from diet-related diseases. Restaurants play a big role in increasing the supply of healthy food in the city.

Detroit vegan soul

There's a vegan soul food restaurant in the city of Detroit.

(Applause) Right.

Detroit Vegan Soul has created an opportunity for Detroiters to eat more vegetarian food, and it's gotten a lot of feedback from Detroiters.

Detroiters want fresh, delicious food that matches their culture.

That's why we started a nonprofit, Food Lab Detroit, to help small food companies budding in the area start and develop healthy food businesses.

Food Labs provide entrepreneurs with incubation, on-the-job training, workshops, technical support and expert connections to help grow and develop their businesses.

They're all very small businesses, but last year they generated more than $7.5 million in total sales and created 252 jobs.

please listen

(Applause) These are just a few examples. Expanding opportunities like this allows everyone to participate and reap the rewards, especially those from historically marginalized neighborhoods.

yeah i know

my city is far from successful

We're still struggling, and I'm not telling you this because I'm telling you that urban agriculture will solve all the problems and challenges that Detroit faces.

I wouldn't say that, but let me say this: urban agriculture has made Detroit look at the city in a different way, a city that can be both urban and rural.

Yes, it's still true that it's a small story, but these stories are local stories, but they're also powerful stories.

These stories are powerful because they're stories of creating new communities in places and spaces left empty after the old ones have been dismantled.

These stories are powerful because they are stories of love. The people of Detroit love each other, they love their communities, and they love Mother Earth.

Hundreds of thousands left Detroit, but there was hope for us who stayed where they left for death.

I didn't give up hope

never gave up

I was always fighting

I know that transforming a metropolis like Detroit into a thriving city, a functioning city, a healthy city, an inclusive city, a city of opportunity for all is no mean feat.

But I believe that in order to strengthen the social cohesion of our communities, and to boost economic opportunity in the most vulnerable neighborhoods, healthy, affordable, delicious, and culturally appropriate food is the starting point.

thank you

(Applause) Thank you.

Having freed Ethic from prison, Hedge takes her and flies to a remote enclave, a plot in the shadows of the Blood Barrier, the wall that surrounds the country.

Residents will soon be gathering for their monthly rations.

Every day people go round collecting works of art and literature from all over the country.

On distribution day, the furnace robot shows up terribly hungry.

If the robot has enough to eat, the lamp will stay on and the food will arrive.

If robots can't be fed, people can't eat.

As soon as the two reach the edge of the living quarters, Hedge's fuel runs out and Hedge and Ethic crash-land.

Fortunately, everyone is too busy preparing for distribution day to notice.

Ethic should be able to find the leader of the underground resistance at the distribution site.

That person knows where the first powerful item is.

The problem is that neither Hedge nor Ethic know the resistance leader's name or what he looks like.

But from the information Hedge has collected, we know one thing: the leader's eyes are green.

②If the leader has red hair, there must be a sequence of the same letters in the name.

③ If the leader wears glasses, there are two vowels in the name

If not, it means that there are three vowels in the name.

There is only one person who has all these things

Ethic is a fugitive, so if he goes out into the crowd, he'll get a lot of attention.

But you can give instructions to Hedge.

The tool that ethics can use is what programmers call "conditional statements."

A conditional statement is a statement of the form "if A then B".

The meaning of this conditional statement is "If A is true, do B."

There are also conditional statements that indicate other cases

"If A is true, do B.

Otherwise, do C." So what instructions would you give Hedge to find a resistance leader?

[Pause the video and think for yourself]

For a problem like this, let's first consider the simple case

What if this person was the only person Hedge could investigate?

What kind of information should I collect?

"Are her eyes green?" is fine, but what other questions can you ask to find out if she's a resistance leader? And what do you do with the answers you get?

[Pause the video and think for yourself]

As a human being, you might have an intuitive sense of how to proceed.

Hedges aren't human, so the difficulty here is that you have to give them comprehensive instructions that work in any case.

Hedge goes through each villager one by one until he finds the person he's looking for.

So you can have a loop that repeats the same instructions, just like you did with the lock on the prison.

But this time the loop needs a question in the form of a conditional statement, and it would be nice to exit as soon as the subject is found.

But first let's organize the information.

Every person has a set of characteristics: eye color, hair color, glasses, name.

Does this person have green eyes?

If so, put ✓ in "Eye Color", otherwise put ×

If you're a redhead, do you have the same letter twice in your name?

If so, mark "hair color" with a ✓, and if the same letters are not repeated, mark "hair color" with an × Red-haired people who do not have the same letters consecutively are not leaders.

But if the hair is blue, Hedge skips the name question and moves on.

The final question was, "If you wear glasses, are there two vowels in your name?

If you're not wearing glasses, are there three vowels in your name? There are people who wear glasses and have one vowel, and people who don't wear glasses and have two vowels.

Those people are not the people I'm looking for, so it's x.

Resistance leaders should have a ✓ or blank answer for each question.

It's okay to have blanks because, for example, if you have blue hair, the rules about red hair don't apply.

As a hedge, you could have everyone ask all the questions, and then select the person with only a blank ✓.

To save time, you should move to the next person as soon as you get an x.

You don't have to know the answer to every question, because if you get even one x, you're not the person you're looking for.

Hedges roams the crowds and within minutes finds resistance leader Adila and brings him to Ethic.

Adira says she can help me steal the first item, the Stone of Power, but on one condition: she wants me to rewrite the programs of the furnace robots that threaten the city in order to start a revolution.

Just then, a swarm of robots landed.

Chak Ek rose from the underworld to the surface of the eastern sea and then to the heavens.

His brother Kinichi Ahau followed suit.

Even though Chak Ek had ascended first, Kinichi Ahau shone brighter. Enraged, Chak Ek returned to the underworld and plotted against his brother.

In Mayan mythology Chaquek symbolizes Venus and Kinichi Ahau symbolizes the Sun.

Known as the morning star and the evening star, Venus moves through the sky, sometimes seen before sunrise, sometimes after sunset, and sometimes not at all.

The ancient Maya already recognized this cycle of roughly 584 days more than 1,000 years ago, and they can still use this method to predict when and where Venus will appear, all over the world today.

Five of these cycles corresponded to almost eight years, and the Mayans were aware of this long cycle as well.

They gave Chak Ek five different forms for each cycle of Venus, and this was repeated every eight years.

Within a 584-day cycle, Venus can be seen in the evening sky for 250 days, disappears for eight days, and then reappears as the morning star.

The ancient Mayans gave special meaning to this timing of this cycle, when Venus disappears and first appears before sunrise.

On this day Chak Ek ascended again from the underworld with a javelin and a dart.

To wreak havoc on the world, he decided to attack his brother and his allies.

His first target was Kawir, god of fertility and thunder.

At the end of the rainy season, Chak Ek raised his spear and shot at Qawir, damaging food and disrupting social order until Qawir revived.

584 days after attacking Kawir, Chak Ek turned to his brother the Sun again.

Every night the sun ran through the underworld in the form of a jaguar.

Chak Ek speared a jaguar at sunrise late in the dry season.

The sun has been damaged, and the world has plunged into an era of chaos and war.

Chak Ek's third victim was the maize god who gave life to all mankind.

Chak Ek attacked him during harvest time.

He was buried in the underworld, making his staple food, corn, inaccessible to Earth's inhabitants.

But the Maize God reappeared three months later from a new beginning, the Cave of the Seven Waters in the East, and brought food to Earth once again.

When the tortoise Akhnak ascended to mark the summer solstice, Chak Ek took the life of the fourth god.

With the death of this auspicious god, the sun, food, and humans were buried in the ground, and chaotic forces ruled.

But out of the chaos a new order was created by Hun Ahau, one of the twin heroes we all know for defeating the gods of the underworld.

A new race was born out of corn

But this stable state did not last long.

Chak Ek's fifth and final victim was a mysterious god from the west, whose death at the height of the dry season shook the order Hung Ahau had established.

Gods, rulers and maize were buried in the underworld.

But Chak Ek's victory was also temporary.

The endless battle for supremacy between the two brothers, Venus and the Sun, continued, the five same afflictions repeated, and as the morning star rose, the world swayed between order and chaos.

In April of 2007, New Jersey Governor John Corzine was involved in a horrific car accident.

He was in the passenger seat of this SUV when he was hit by a car on the Garden State Parkway.

He was rushed to a nearby trauma center with multiple fractures and lacerations.

I needed immediate surgery, seven units of blood transfusions, ventilator help, and many more surgeries.

It's amazing that he survived

But perhaps even more surprising was that he wasn't wearing a seatbelt.

In fact, he never wore a seatbelt, and the state police officer who drove Governor Corzine always asked him to wear a seatbelt, but he didn't.

Corzine was a senator from New Jersey before he became governor of New Jersey, and before that he was the CEO of Goldman Sachs, which went public and made hundreds of millions of dollars.

No matter what you think of him politically or how he makes money, no one will say he's stupid.

But he wasn't wearing a seatbelt at the scene of the accident, and we all know seatbelts save lives.

This story shows a fundamental weakness in our approach to improving health behavior.

Almost everything we tell doctors and patients is based on the idea that humans act rationally.

If I get information from you, I'll process it in my head and change my behavior as a result.

Didn't he know that seat belts save lives?

Wasn't he the only one listening?

(Laughter) What John Corzine lacked was action, not knowledge.

It's not that I was ignorant

I just didn't move

I believe that the mind is a path of high resistance.

It's hard to change people's minds with information

It's even harder to change people's behavior with information.

The only way to significantly improve health and healthcare is by significantly improving health and healthcare behavior.

If you hit my patellar tendon with a mallet, my leg would move forward, much faster and more reliably than I could consciously move it.

this is a reflection

What we need to do is find similar reflexes and incorporate them into medicine.

But the problem is that the most typical way to motivate people is based on the idea of ​​education.

They think people didn't do what they should because they didn't know.

"If you knew smoking was bad for you, you wouldn't smoke."

or think economically

The premise is that we're always calculating the gains and losses for every action we take, and that we're making perfectly right and rational decisions.

If that's true, then all we have to do is have the perfect payment system for doctors, the perfect copayment and deduction system for patients, and all will be well.

In fact, there's a better way to do it in behavioral economics.

Behavioral economists recognize human irrationality.

We make decisions based on emotions and are influenced by framing and social situations.

You don't always act in your own long-term interests first.

But the great thing about behavioral economics isn't that it shows us that humans are irrational, it's that it shows that human irrationality is highly predictable.

It's this predictability of a person's psychological shortcomings that helps them develop strategies to overcome them.

If you know, you can prepare

In fact, behavioral economists often use the very reflexive behaviors that plague us to our advantage.

An example of irrationality is the "present bias," the mentality that immediate outcomes are more motivating than far-future, much more important outcomes.

If I'm on a diet -- which I always do -- (Laughter), when someone suggests a chocolate cake that looks delicious, I know I shouldn't eat it.

I know that cake will be the meat of the underbelly, and all that kind of food is.

But the chocolate cake looks really delicious, and it's right in front of you, so you can start your diet tomorrow.

I liked comedian Stephen Wright

He used to throw out Zen-ish epigrams.

My favorite is this: "Hard work pays off in the future, but laziness pays off now."

(Laughter) Bias now also exists in patients.

Let's say you have high blood pressure. Even if you really want to avoid a heart attack and know that taking antihypertensive drugs is the best way to reduce your risk, the avoidable attack is in the far future, and the time to take the medicine is now.

Nearly half of patients prescribed high blood pressure medication stop taking it within a year.

Think about how many lives you could save just by solving this one problem.

We also tend to overestimate small probabilities.

That's why lotteries are so popular, even though the return on investment is extremely low.

Maybe some of you buy a lottery ticket, it's fun, right?

But let's frankly admit that it's a terrible investment for retirement savings.

I saw a bumper sticker that said, it's true, "The lottery is a tax on people who can't count."

(Laughter) It's not that I can't do the math, it's that I can't feel the math.

Also we care too much about regrets

I have a strong reluctance to miss an opportunity

There was a lottery recently, called the Mega Jackpot Lottery, where you can win over a billion dollars if you hit the jackpot.

At my workplace, everyone contributes money to buy lottery tickets, and I don't do anything.

I walk around the office whispering things like, "The lottery is a tax on people who can't count."

(Laughter) But then I suddenly thought, wait.

What if I hit it?

(Laughter) The next day, I'm the only one showing up at work.

(Laughter) It's not that I don't want my colleagues to hit me.

I just don't want you to hit me without me

It's quicker to take a $20 bill out of your wallet and shred it, because the result will be the same.

I handed over the $20 bill, knowing I shouldn't have attended, and never got it back.

(Laughter) We did a lot of experiments with patients, and we gave them electronic pill bottles, so we could tell if they had taken their medicine.

I'll give you a lottery ticket as a reward for drinking

prize money

But in order to receive the prize money, you must have taken the medicine the day before.

If you haven't, you'll get a message that says, "I could have won $100, but I didn't take my medicine yesterday, so I won't be taking the lottery."

Of course, the patient is disappointed.

They probably don't like the feeling of missing out on opportunities, and because they know they're going to regret it, they're much more likely to avoid it and take the drug.

Using the sense of regret doesn't work.

This leads to a more general finding: when people understand how irrational they are, it's much easier to help them.

This kind of irrationality works in the men's bathroom.

For those of you who don't get to see the men's restroom often, let me show you what the men's restroom looked like.

(Laughter) The floor is covered in pee.

(Laughter) The solution to this problem is to draw a fly in the toilet bowl.

(Laughter) (Applause) That makes a lot of sense.

(laughs) There was a fly! I'll guess and show you!

(laughs) Come on, let's go

(Laughter) Of course you want to ask, why would you spill it on the floor if you could aim for a fly?

If you're going to pee on the floor, why in front of the toilet?

Anywhere, right? (smile)

The same applies to medicine

At my hospital, we had a problem with doctors prescribing branded drugs when we had generics.

Each line in this graph is a different drug.

Shows how often generic drugs are prescribed

Top drugs are 100% generic

The lowest drugs have generic prescribing rates of less than 20%.

Talking to doctors and having educational sessions didn't work, and all the lines are pretty much flat.

And then we installed software on our electronic medical records to default to generic drugs instead of branded drugs --

As the untrained eye should have seen, the problem was solved in an instant, and it has remained so.

In fact, two and a half years into the program, the hospital has saved $32 million.

Is not it amazing? 32 million dollars

What we've done is just make it easier for doctors to do what they want to do.

Taking advantage of the feeling of not wanting to lose also works well.

I did it in a contest to get people to walk more.

I wanted them to walk at least 7,000 steps, so I counted them with an accelerometer on their phone.

The control group, Group A, was only told whether they had walked 7,000 steps.

B group has financial incentives

Earn $1.4 every day you walk 7,000 steps

The C group gets the same amount, but it's presented as a loss instead of a gain. $1.4 a day is $42 a month, so at the beginning of the month, you deposit $42 into a virtual account that they can see, and then subtract $1.4 from that on any day they don't walk 7,000 steps.

Economists would say that the incentives are the same for both.

For every 7,000 steps you take each day, you'll get $1.40 richer.

But behavioral economists would say the two are different, because people are more motivated to avoid losing $1.40 than to gain $1.40.

the result was exactly

Those in the group who received $1.40 for walking 7,000 steps each day were no more likely to reach their goal than the control group.

financial incentives didn't work

But incentives presented in the form of losses increased the number of target days by more than 50 percent.

Economically it doesn't make sense, but psychologically it makes sense: the fear of losing something is stronger than the joy of getting it.

Now, I'm using this approach to help patients walk more, lose weight, and take their medications.

money is the motivation

everyone knows

But when combined with human psychology, it can have a much greater impact.

Of course, money also has its downsides.

There's an interesting example of a daycare center in that regard.

The worst thing you can do at a daycare is pick up your child late.

unfortunate for everyone

Children start crying because you don't love them

(Laughter) The teacher isn't happy because he's coming home late.

Parents feel guilty too

One daycare center in Israel tried to solve this problem by doing what many daycare centers in the United States do, which is to fine parents who pick up late.

The fine is 10 shekels - about 300 yen.

What do you think happened?

The number of late pick-ups "increased"

If you think about it, it makes sense

What a bargain!

For only 10 shekels- (Laughter) I can't believe I can take my kids for the night!

(Laughter) They took away that strong internal incentive to keep up, and replaced it with a cheap price.

Worse, when they realized their mistake, they eliminated the fine, but the late pick-ups were still common.

You've poisoned the social contract.

There are many strong internal motivations in medicine.

Both doctors and patients want to do the right thing.

Financial incentives can help, but don't expect too much money in healthcare.

Perhaps the strongest influence on health behavior is social interaction.

Social engagement is powerful in medicine and works in two directions.

First, humans fundamentally care what other people think.

So one of the most powerful ways to change people's behavior is to make it visible to others.

We behave differently depending on whether we are being watched or not.

Some restaurants have handwashing stations outside instead of inside the restrooms.

Everyone can see if you've washed your hands.

I don't have any data, but I suspect that more people would wash their hands in that arrangement.

You do your best when you're being watched

In fact, there's an amazing study that was done in the intensive care unit of a Florida hospital.

Hand washing was infrequent there, not to mention dangerous, because you could spread the infection.

So the researchers put a picture of an eye on top of the washroom.

just a picture, not a real person

It's not even the whole face, it's just the eyes that say, "I'm watching."

(Laughter) Hand washing more than doubled.

We seem to care so much about what other people think of us that we improve our behavior just by imagining what other people think of us.

And we don't just care what other people think, we basically model what other people do.

Now back to seat belts

When I was little, I loved the TV series "Batman," starring Adam West.

Batman and Robin were super cool at what they did, and of course the Batmobile was super cool.

The show ran from 1966 to 1968, when seat belts were an optional accessory.

So the show's producers did something very important.

As Batman and Robin get into the Batmobile, we've focused the camera on their knees to show them putting on their seatbelts.

Batman and Robin wear seat belts, so I'm pretty sure I'm wearing one too.

I think that program saved a lot of lives.

The model can also be used in medicine

Physicians use antibiotics better when they see how other physicians use them.

Much of what we do in medicine is hidden and invisible to others, but doctors are social creatures too.

Social impact is effective in medicine, too.

Using regret and loss aversion can be equally effective.

If everyone thought they were all rational all the time, you wouldn't think there would be a way to do this.

Now, let me tell you, I'm not saying rationality is bad.

that is irrational

But we all know that it's the irrational part of the mind that gives rise to courage, to creativity, to inspiration, to passion.

I also know that

It is much more effective to embrace the irrationality than to ignore or fight it to improve human health behavior.

In medicine, understanding human irrationality is also a tool.

Making good use of that irrationality may be the most rational course of action.

thank you for listening

(applause)

Let me start by telling you about an email I recently found in my inbox.

My inbox is pretty weird, because I'm a therapist and I write a counseling column called "Dear Therapist," so you can imagine what kind of email I get.

I've read thousands of extremely intrusive letters from strangers all over the world.

There are stories of broken hearts and bereavements, and stories of fights with parents and siblings.

I keep it in a folder called "problems of living"

I get a lot of emails, but to help you get to know my world, read one of them.

This is the content

"Dear Therapist, I've been married for 10 years and it was going well until two years ago.

Around that time, my husband didn't want to have sex so much, and now he almost doesn't."

You never thought it would be like this

(Laughter) "Last night, I found out that for the past few months, my husband has been on long phone calls with women at work in the middle of the night.

I looked him up on the internet and he was a really nice guy.

How could this happen-

When I was very young, my father had an affair with a female colleague, and my family was torn apart.

needless to say i'm really shocked

Even if I stay married, I will never trust my husband again.

But I don't want my kids to go through parental divorce or stepmothering.

What shall I do? ”

what do you guys think?

When I see a letter like this, I feel sorry for the pain of being cheated on

You may be tempted to make it even harder because of your father's problems when you were a child.

You're going to have the same sympathy for this woman as I do, and you'll have a kind of not-so-good impression of her husband.

That's how I feel when I read the emails in my inbox.

But responding to emails like this requires a lot of thought, because I know that every email I receive is just a story written by a single author.

There is another version of that story

always present

I know this because if there's one thing I've learned as a therapist, it's that we're all unreliable narrators of our own lives.

I am

so do you

Everyone you know is

Maybe I shouldn't have said this, because you won't believe me anymore.

I'm not saying you're lying on purpose.

A lot of what people say is the real truth—from that person's point of view at the time.

What you emphasize, what you downplay, what you include, what you exclude, what you look at and what you try to show, the story becomes biased.

Psychologist Jerome Bruner sums it up beautifully: "When you talk, it's inevitable that you'll take some moral stand."

We all live our own life stories

The reason I made the choice, the reason why things went wrong, the reason I treated someone the way I did -- of course I deserved it, and the reason someone treated me the way I did -- it was unfair, of course.

Stories are the way we make sense of life.

But what if the stories we tell are misleading, incomplete, or just plain wrong?

Instead of making it easier to understand, you'll get bogged down.

We believe that stories are shaped by circumstances.

But what I've seen over and over again in my work is quite the opposite.

Your life is shaped by what you say

That's the dangerous part of the story, and it makes him unhappy, but there's also power there.

By changing your story, you can also change your life.

I want to talk to you today about how to do that.

It's true when I say I'm a therapist, and I'm not an untrustworthy narrator for that matter.

When someone asks me what I do, like when I'm on a plane, I say I'm an editor.

Because if you say you're a therapist, you'll get a strange response, "Well, a therapist?

So am I going to be psychoanalyzed? ”

I think to myself, "(a) I won't (b) Why are you here?

If I say I'm an OB/GYN, are you going to ask me if I'm going to have a vaginal examination? ”

(Laughter) But it's also because when I say I'm an editor, it's true.

A therapist's job is to help people edit, and what's interesting about my role in "Dear Therapist," is that I'm not editing for one person.

I'm trying to teach readers how to edit, using one letter each week as an example.

And there's a lot of thinking, "What's irrelevant here?"

"Is the main character moving forward or just spinning around?" "Are supporting characters important or in the way?"

"Does this development reveal hidden themes?"

And I find that many people's stories center around two main themes.

One is freedom and the other is change.

That's where I start when I edit

think about freedom

The story of freedom goes something like this, we generally think we have a lot of freedom.

When it comes to the matter at hand, I suddenly feel like I have no freedom at all.

A lot of our stories are about feeling trapped.

They feel trapped by family, work, relationships and past ties.

Sometimes we lock ourselves in with self-deprecating narratives, which you all know, from social media.

There is a story that says, "Everyone has a better life than I do."

There's the story "I'm a fake" There's the story "I'm not loved" There's the story "I'm not good at everything"

There's a story that goes, "If you call Siri and you don't answer, it's because you hate yourself." I'm not the only one

The woman who wrote that letter also feels trapped.

If I stay married, I can never trust my husband again, and if I divorce, my children will suffer.

There's a cartoon that really shows what's really going on in these stories.

A captive is desperately shaking the bar to get out.

But the sides are open

no iron bars

This person is not in prison

many of us are

I feel completely trapped, stuck in an emotional prison.

The reason you don't look closely at the bars to try to break free is because you know there's a trap.

freedom comes with responsibility

In order to take responsibility for your role in the story, you will have to change.

That's another common theme in people's stories.

The story goes something like this: "I want to change," he says.

What it really means is, "I want the other characters in the story to change."

Therapists describe this dilemma by saying, "If only the queen had a ball, she could have been king."

(laughs) It doesn't make sense.

Why don't you want the protagonist, the center of the story, to change?

I think it's because change, even the positive ones, comes with a surprising amount of loss.

Loss of familiarity

Because even if that familiar thing is uncomfortable and miserable, it's familiar to me, from the characters, the setting, the plot, to the recurring dialogue in the story.

"Because you won't do the laundry!"

"You did it last time!" "Oh, when?"

There's a strange relief in knowing how the story unfolds each time.

Writing a new chapter is stepping into uncharted territory.

staring at a blank page

Any writer will tell you there's nothing scarier than a blank page.

But I want you to know

It means that once you've edited your story, it's much easier to write the next chapter.

In our culture, we often say, "Know yourself."

To know yourself, you also need to forget yourself

It means letting go of the stories you've been telling yourself all along, to live your own life, to live a different story than the one you've been telling yourself.

That's how you get out of that grate.

Let's go back to the story of the woman struggling with her cheating husband.

It was a consultation about what to do

There's a word that I put up in my office: ultracrepidarianism.

It means "the habit of giving advice or opinions beyond one's knowledge and ability."

that's a nice word

You can use it in many different situations, and I'm sure you'll all be using it after this talk.

I use it to tell myself that as a therapist, I can help people sort out what they want, but I can't make life choices for them.

Only you can write your own story, and all you need is a few tools to do it.

I'm here to show you how you can revise your own story by editing this woman's letter.

So first, think about one of the stories you're telling yourself that isn't working out.

It could be your situation, it could be someone you care about, it could be yourself.

Then turn to other characters

Who's playing a part in keeping that bad narrative alive?

For example, if the woman in that letter consulted her friend, she would probably do what I would call "stupid sympathy."

Foolish sympathizers go along with their narratives and say things like, "That's really, really unfair," to a friend who didn't get the promotion they wanted, even if it's happened many times before and it's because the person isn't putting in as much effort and stealing office supplies.

(Laughter) I say to my friend who's been dumped by a guy, "You're a real jerk," even if you know that your friend's romantic behavior is a little bit problematic, and it's because you're constantly texting and rummaging through their drawers.

I know the problem, if you go to any bar and they fight, maybe you're the cause.

(Laughter) To be a good editor, you have to show wise compassion, not just to your friends, but to yourself.

In technical jargon, this is called "delivering truth bombs with compassion."

Truth bombs are compassionate because they make us see things we've left out of the story.

The truth is, we don't know if this woman's husband is cheating, why her sex life changed two years ago, or what a late-night phone call looks like.

Maybe you're writing a story of one-sided betrayal from past experiences, or perhaps there's something you didn't want to say in your letter, or even look at yourself.

It's like the story of a man taking a Rorschach test.

You know the Rorschach test, right?

It's the kind of psychologist who shows you these ink stains and asks, "What do you see?"

And the man replies, "It doesn't look like blood at all."

And the psychologist says, "Well, tell me more about what you don't see."

In writing, we call this the point of view.

What is it that the narrator does not want to see?

read the letter again

This is the content

"Dear Therapist, I have a question about my wife.

Everything I do these days seems to irritate my wife, even small things like the sound of chewing food.

I noticed that my wife added more milk at breakfast to keep the granola from making noise.”

(Laughter) "I feel like my wife has become critical of me since my father died two years ago.

I'm very close to my father, and my wife, who left me when I was little, doesn't understand my pain.

I had a friend at work who lost his father a few months ago, and he understood my grief.

I wish I could talk to my wife like I talk to my friend, but she can't stand me anymore.

How can I get my wife back together? ”

Now, as you've all probably noticed,

This is the same story we read before, just from a different narrator's point of view.

A wife's story is about a cheating husband, and a husband's story is about a wife who can't comprehend her grief.

What's important to note here is that even though the two stories are very different, they both seek to connect.

If you can get out of the first-person narrative and tell the story from another person's point of view, you'll be able to empathize with them much more and see the story open.

This is the hardest part of the editing process, but that's where change begins.

What would happen if you wrote your story from someone else's point of view?

What do you see from that wide field of view?

So I often tell people who are depressed, "You're not a good person to talk to about yourself right now." When you're depressed, you distort your story.

narrows the field of vision

It's the same when you're feeling lonely, hurt, or rejected.

You create a distorted story through a very narrow lens, and you don't even realize there's a lens.

and spread fake news about yourself

I have something to tell you

I wrote the letter for my husband

I had a hard time deciding between granola and pita chips.

It's based on many different versions of the story that I've seen over the years in my work as a therapist and in my columns.

Two people involved in one situation, unknowingly both wrote to me, and found two versions of the same story in my inbox.

That's what really happens

I don't know what another version of this woman would look like, but one thing I can tell you is that you'll have to write it yourself.

Brave editing will make her write a deeper version.

Even if her husband was actually cheating on him in some way, she still doesn't need to know what the plot is.

Because editing gives you a lot more possibilities of what kind of story it could be.

Sometimes you're in a really bad dead end, and you're stuck in that dead end.

I call them "complainers who refuse help."

I'm sure you know someone like that

When I suggest something, I always deny it, "Well, that's not going to work, because..."

"Hmm, it's impossible. You can't do that."

"Hmm, I want friends, but humans are annoying, aren't they?"

(Laughter) What they really refuse to do is edit their stuck, miserable stories.

So for those people, we change our ways.

say something different

"We're all going to die"

I'm sure you're glad this guy wasn't your therapist.

The person who was told, just like you, looks utterly confused.

But there's a story about me that's bound to be written someday, isn't it?

It's a story called an obituary

Instead of writing your own misfortunes, I'm suggesting you shape this story while you're still alive.

Be the hero, not the victim, in your own story Choose what unfolds on the pages of your mind and shape your reality.

I say life is about deciding which stories to listen to and which stories to change.

The effort to revise is worth it, because nothing determines the quality of your life more than the stories you tell yourself.

If it's the story of your life, you should try to make it a Pulitzer Prize winner.

Most of us aren't complainers who refuse help, or at least we don't think we are.

But it's easy to do so when you're feeling anxious, angry, or vulnerable.

So the next time you have a problem, remember that we all die.

(Laughter) And then get out your editing tools and ask yourself, what do you want your story to be?

and write a masterpiece

thank you

(applause)

Bacteria are the oldest organisms on earth

It's been around for billions of years, and it's a single-celled organism that requires a microscope to see.

It has the peculiarity of being a single cell with only one piece of DNA.

There are very few genes, and very little genetic information that encodes all the traits they do.

Bacteria live by consuming nutrients from their surroundings, and when they double in size, they split themselves in half, forming two cells, and so on.

Growing and splitting, growing and splitting -- life is boring, isn't it?

You think you're human, but I think

Let's say this human figure represents a generic "human", and all the circles in this human figure are the cells that make up a human being.

You need a trillion human cells in order for you to be human and to be able to do many things as a human.

But you have 10 trillion bacteria attached to you inside and outside your body all the time.

Humans carry 10 times more bacteria than their own cells.

Of course, it's all about the DNA, and here you have the A, T, G, C sequences that make up all the genetic information that gives you your attractive traits.

you have about 30,000 genes

But in your lifetime, you'll carry 100 times as many bacterial genes in or on your body.

You're only 10 percent, or 1 percent, depending on how you measure it, human.

You think you're human, but I think you're 90 to 99 percent bacteria.

(Laughter) Bacteria aren't just on you.

Bacteria are incredibly important and keep you alive.

Bacteria are an invisible armor that protects us from environmental attacks and keeps us healthy.

It digests our food, makes vitamins, educates our immune system, and eliminates bad bacteria.

So bacteria are essential to our survival, but they don't get a lot of attention.

But when it comes to doing things that are harmful to the body, it's often in the news.

In other words, there are bacteria on the planet that have absolutely nothing to do with your life, and if you come in contact with them, you'll get horribly sick.

So the question in my lab is, do we want to think about the good things that bacteria do, or the bad things that they do?

The question is, how can bacteria do that?

because they are very small

cannot be seen without a microscope

They're seen as unsociable hermits, with boring lives that just grow and split.

They're so small that they don't seem to affect the environment as long as they act individually.

So we wanted to wonder if bacteria had other ways of living.

The clue to this answer came from the marine bacterium Vibrio fischeri.

What you see on the slide is someone in my lab holding a broth flask containing a bacterium, a beautiful, harmless species from the ocean called Vibrio fischeri.

The peculiarity of this bacterium is that when it emits light, it becomes bioluminescent, similar to fireflies.

I didn't do anything to the cells, I just turned off the lights in the room and took a picture and it looks like this.

What's interesting here is not that the bacteria are glowing, but when they're glowing.

What we found is that when there's only one bacterium, which is in a diluted medium, it doesn't glow.

But when it multiplies and exceeds a certain number, all the bacteria glow at the same time.

The question is, how do these primitive organisms, bacteria, distinguish between when they're alone and when they're in a group, and start doing things together?

It turns out that when the bacteria glow, they're talking to each other and using chemicals to do that.

Let's say this is a bacterial cell.

Does not emit light when there is only one

But that cell secretes a small molecule, which is like a hormone, and it's shown by the red triangle, when there's only one bacterium.

The molecules simply flow away, and the bacteria don't glow.

But as the bacterium grows and divides, and everyone begins to produce the molecule, the extracellular amount of that molecule increases in proportion to the number of cells.

And when the number of molecules exceeds a certain amount, it tells the bacterium how many others are nearby, and the bacterium recognizes the molecule and simultaneously switches on to emit light.

And that's how bioluminescence works, and this is how we talk about chemistry.

The reason Vibrio fischeri glows is biological, and Vibrio fischeri is the fluorescent light of the sea.

I live in this squid

This is a Hawaiian hikari dango squid

It's on its back, but can you see those two glowing ridges here?

Here is Biblio Fischeri

living in close quarters

That molecule is there and it's shining

The squid tolerates this mischief because it needs this light.

Here's how this symbiotic relationship works: This squid lives knee-deep on the coast of Hawaii.

Squids are nocturnal and sleep in the sand during the day.

At night, they come out to hunt.

On moonlit nights or bright starlit nights, that light travels through the water to the depths where the squid is, a few feet deep.

The squid has a shutter that opens and closes this light-emitting device inhabited by bacteria.

The squid has a sensor on its back that senses how much light from the moon and stars hits its back.

You open and close that shutter so that the light coming out of the bottom of the squid, which is produced by the bacteria, is matched exactly with the light hitting your back, so that the squid doesn't cast shadows.

The squid uses the light produced by the bacteria to create light-emitting devices within its hostile defense device, which prevents predators from calculating the squid's wake from shadows and preying on it.

It's a sea stealth bomber

(Laughter) But you might think, squid has a big problem, it's got a lot of dying bacteria, and it can't sustain it.

So early in the morning, when the sun rises and sleeps buried in the sand, the squid has a pump linked to the circadian rhythm.

When the sun rises, it releases 95% of the bacteria out of the body.

There, the bacteria dilute, the hormone molecules flow away, and the bacteria stop glowing.

I don't mind the squid because it sleeps in the sand

As the day goes on, as the bacteria multiply, they release those molecules, and they glow at night, just when the squid needs them.

First, we looked at how bacteria do this, but then we brought in the tools of molecular biology to see what the actual mechanism was.

It turns out that - again, this is a cell, but Vibrio fischeri is a protein -

It's got this red square, and it's the enzyme that makes that hormone molecule, the red triangle.

As cells multiply, they all release this molecule into the environment, and there are more molecules.

Bacteria also have receptors on their surface, and they fit together like a lock and key with the molecule.

the same receptors on the surface of our cells

When a molecule exceeds a certain amount, it carries information about the cell's number, binds to a receptor, and then carries the information inside the cell, turning on the switch for the cell to light up at the same time.

And the reason this is interesting is because over the last decade, we've learned that it's not just unique to these weird, glowing, dark oceans at night, but that it's found in bacteria in general.

So it turns out that bacteria can talk to each other.

Only when we put chemicals into words, recognize those words, and have all of our cells participating at the same time, can we turn on collective behavior that works.

It has a clever name, and it's called "quorum sensing."

Bacteria vote with chemicals, the votes are tallied, and everyone reacts to the vote.

What's important about today's story is that we know there are hundreds of these collective behaviors of bacteria.

Of these, the most important one for us is toxicity.

It's not like at most a few bacteria get inside your body and start secreting toxins.

What it turns out is that once bacteria invade, they first wait, they start multiplying, and then they count themselves with those molecules, and when they realize they've reached the right number, and they all launch a toxic attack all at once, they'll succeed, and they'll be able to take down a giant host.

Bacteria constantly control pathogenicity through quorum sensing.

That's how it works

We then looked at what these molecules look like.

It's the red triangle on the previous slide.

This is the Vibrio fischeri molecule

use this to talk to each other

So we started looking at different bacteria, and these are some of the molecules we discovered along the way.

What I want you to understand is that these molecules are related.

The left side of the molecule is the same for all bacteria.

But the right half of the molecule is slightly different in each species.

That's what gives the language its exquisite bacterial species-specificity.

Each molecule only binds to the same type of receptor of the other.

That is, having a private, confidential conversation.

This is a conversation within the species

Each bacterium uses a unique molecule that allows it to count the number of similar species.

And once I got there, I thought we were beginning to understand how bacteria behave socially.

But what we really thought was that most bacteria don't live on their own, they live in unimaginable mixtures -- hundreds or thousands of other species of bacteria.

And that's what's shown on this slide. This is your skin.

This is just a picture -- a micrograph of your skin.

Almost any part of the body looks like this

What I want you to see is that there are all kinds of bacteria.

So what I thought was, if this is really communication between bacteria and they're counting likes, then it wouldn't be enough if they were just talking to each other in the same species.

We need to do a statistical survey of bacteria other than our own in the bacterial population.

So we go back to molecular biology and look at different species of bacteria,

And what we found was that bacteria speak multiple languages.

Each bacterium has its own species-specific system, a molecule that says "I."

And in parallel, there's a second system, which is the common language between species.

So bacteria have a second enzyme that produces a second signal, a dedicated receptor for it, and that's the language of trade between bacterial species.

It's used by different species of bacteria, and it's a language of communication between species.

In other words, bacteria can count how many "selfs" they have, as well as how many "non-selfs" they have.

The bacterium takes that information internally and decides what action to take depending on which species are in the majority and which species are in the minority.

So I went back to chemistry and figured out what this common molecule is, the pink ellipse in the slide.

It's a very small molecule with five carbons.

The key thing we found was that all bacteria had exactly the same enzymes and made exactly the same molecules.

So all of these bacteria use this molecule for interspecies communication.

Esperanto for bacteria

(Laughter) And then, when we got there, we realized that bacteria could talk to each other in this chemical language, and we thought, well, this could do something practical.

It might be possible

I talked about how bacteria behave socially, exchanging information with molecules.

And he also said that it's important to use quorum sensing to exert virulence.

So I thought, what happens when bacteria can't talk to each other or hear each other? and

Could it be a new kind of antibiotic?

Of course, you've all heard that our antibiotic options are running low.

Today, bacteria are terrifyingly multi-drug resistant because all the antibiotics we use are bactericidal.

It either ruptures the cell membrane or prevents the bacterium from replicating its DNA.

Traditional antibiotics kill bacteria, but as a result, resistant strains survive.

And we are now facing this global epidemic problem.

So we thought, what if we do something like behavioral modification so that the bacteria can't talk to each other, they can't count, they can't tell when their virulence kicks in? and

That's exactly what we did, and we took two strategies.

The first target is the intraspecies communication system.

So we built a few things that looked like real molecules, but as you can see, a little bit different.

The substance binds to the receptor and interferes with recognition of the real molecule.

By targeting the red system, we can create antiquorum-sensing molecules that are specific to bacterial species and disease types.

I did the same thing with the pink system.

We took the common language molecule and twisted it a little to create an antagonist for an interspecies communication system.

The hope is that it could be used as a broad-spectrum antibacterial agent for all types of bacteria.

I'll show you our strategy at the end.

In this, I'm only using intraspecies molecules, but the logic is exactly the same.

So when a bacterium invades an animal -- in this case a mouse -- it doesn't immediately become toxic.

They invade, start multiplying, and then start secreting quorum-sensing molecules.

When the bacteria know when there are enough to attack, the animal dies.

What we've been able to do is give these highly virulent infections, along with anti-quorum-sensing molecular drugs.

It's similar to a quorum-sensing molecule, but with a slightly different shape, like this slide.

What we found is that if you give an animal an antiquorum-sensing molecular drug at the same time as a multidrug-resistant pathogenic bacterium, the animal survives.

This will be the next generation of antibiotics that will address the huge problem of resistance, at least for the time being.

And think about it, bacteria can talk to each other, they use chemicals as words, they use very complex chemical vocabularies, and we're just starting to research that.

Of course, this method allows bacteria to behave like multicellular organisms.

In the spirit of TED, they work together because they can make a difference.

So bacteria can act collectively and perform tasks that they could never do alone.

And what I want to tell you more about is that this is the invention of multicellularity.

Bacteria have been on Earth for billions of years, humans for hundreds of thousands of years.

Bacteria set the rules of behavior for multicellular tissues.

By studying bacteria, we can also gain insight into the multicellularity of the human body.

If we can discover principles and laws from primitive organisms like bacteria, we may be able to apply them to other human diseases and behaviors.

You see, bacteria can distinguish between themselves and others.

Using two molecules that speak "self" and "other than myself"

Of course, we're doing it at the molecular level and at a broader perspective, but I'm thinking more about molecules.

that's exactly what's going on inside your body

You can't confuse heart cells with kidney cells in your body, because these chemical reactions are happening all the time, and the molecules tell you which organ cells they're in and what they do.

Bacteria invented it, and humans just evolved from it, and I think all the ideas are in simple systems that we can study.

And finally, to reiterate the practical part of this story, we're creating these anti-quorum-sensing molecules and developing them as new therapeutic modalities.

And we're also making "pro-quorum-sensing molecules" for every good, magical bacterium on Earth.

The aim is to make the molecules work better within the system.

Remember, there are 10 times more bacteria in you than you are, keeping you healthy.

What we're trying to do is strengthen the conversational system of the bacteria that live with you, improve that conversation so that you're healthier, and get them to do more of what we want them to do.

Finally, I'd like to show you guys this is my colleague from Princeton University in New Jersey.

Everything I told you was discovered by someone in this photo.

When you learn something, like how the natural world works, or something that's absurd about the natural world, and you read about it in the newspapers, and you hear about it, it was a child who did it.

Science is done by such people

Between the ages of 20 and 30, they are the engines of scientific discovery in this country.

I am very lucky to work with them

I'm getting older, but they're still the same age.

it's a really fun job

Thank you for inviting me here. It's an honor to be here at this conference.

(Applause) Thank you.

(applause)

I'm in the business of keeping secrets, and that includes your secrets.

Cryptographers are at the forefront of defense in a war, a war that has been going on for centuries, between the cryptographers and the codebreakers.

and this is information warfare

Digital is the battlefield of modern information warfare.

It's a battle on your phone, on your computer, on the Internet.

Our job is to create an encryption system for your emails, your credit card numbers, your phone calls, your text messages, your fancy selfies.

Until recently, we cryptographers thought we could win this war forever.

Now, your smartphone uses encryption technology, and I thought this kind of encryption would always be unbreakable.

We were wrong, because quantum computers have arrived, and quantum computers are going to completely change this war.

Throughout history, creating and breaking cryptography has always been a cat-and-mouse game.

As far back as the 16th century, Mary Queen of Scots thought she sent a letter that only her soldiers could decipher.

But Queen Elizabeth of England had codebreakers who could crack the whole text.

When they deciphered Queen Mary's letter, they discovered that she was plotting to assassinate Queen Elizabeth, who was then beheaded.

Centuries later, during World War II, the Nazis used Enigma to communicate, a much more complex and unbreakable encryption scheme.

But the wonderful Alan Turing, who invented the computer as we know it today, built a machine that could read Enigma.

He deciphered the German military's message and helped end Hitler's Third Reich.

Stories like this go on for centuries

As cryptographers improve their encryption technology, cryptanalysts fight back to find a way to crack it.

This war goes back and forth and continues to fight evenly.

This continued until the 1970s, when cryptographers found a breakthrough.

They discovered a very powerful method of encryption called public key cryptography.

Unlike all methods used in the past, the two parties sending sensitive information do not have to exchange cryptographic keys in advance.

Public-key cryptography allows us to communicate securely with anyone in the world, whether or not we've ever exchanged data with that person, without you or me knowing.

Whether you're texting a friend to go out for a beer, or you're at the bank and want to transfer a lot of money to another bank, modern encryption technology allows us to securely transfer data within milliseconds.

The brilliant idea that made this magic possible relies on a high-level math problem.

Cryptographers are deeply interested in problems that computers cannot solve.

For example, a calculator can multiply any two numbers together, no matter how big it is.

But when you turn the multiplication answer into the question, "What are the original two numbers?," it becomes a very difficult problem.

If you ask the question, "What is the two-digit number that multiplies to 851?," most people in this room will have a hard time figuring out the answer until the end of the talk, whether they use a calculator or not.

And if we take a slightly larger number, there is no computer on earth that can do this calculation.

In fact, it would take even the world's fastest supercomputer longer than the age of the universe to find the two numbers that add up to this number.

This problem is called "factoring," and it's what your smartphones and laptops are using right now to protect your information.

This is the foundation of modern cryptography

The fact that all the computers on the planet cannot be answered is why we thought we, the cryptographers, had a permanent edge over the codebreakers.

I may have been a little cocky, because just when we thought we had won the war, a number of 20th-century physicists came forward to show us that the laws of physics that we believed to be true until then -- the laws on which modern cryptography was based -- are not true.

I used to think that an object could never appear in two places at the same time.

it wasn't

I used to think that nothing could spin clockwise and counterclockwise at the same time.

but it was wrong

I thought it was impossible for two objects separated in opposite directions, light years apart, to have an instantaneous impact on each other.

this was also a mistake

Is this always the path life takes?

Just when you think everything is ready, a bunch of physicists come and show you that the basic laws of the world are completely wrong? (Laughter) I messed everything up.

In the realm of protons and electrons, tiny little subatoms, the classic laws of physics that we know and love so well have gone.

And then quantum mechanics came in.

Quantum mechanics says that electrons spin clockwise and counterclockwise at the same time, and protons can be in two places at the same time.

It's like science fiction, but it's because the strange quantum nature of the world has been hidden from us.

And it went into hiding until the 20th century.

But now that quantum nature has been discovered, the world has entered an arms race to build quantum computers, computers that take advantage of the quirky and insane behavior of quantum.

They're so revolutionary and powerful that they make the fastest supercomputers of today look useless in comparison.

In fact, for some problems of intense interest, the fastest supercomputers look like abacuses compared to quantum computers.

Yes, that wooden tool with a ball.

Quantum computers can simulate chemical and biological processes that classical computers cannot.

It's guaranteed to help solve some of the world's most serious problems.

Helping us solve the problem of global hunger, addressing climate change, finding cures for diseases for which we have no cure, epidemics during pandemics, creating superhuman artificial intelligence, and perhaps more importantly than all of these things, helping us understand the nature of our universe.

But this tremendous potential comes with great risks.

Remember that big number I was talking about earlier?

it's not about 851

But for those of you who can't find the factor, let me help you. The answer is 23 X 37.

(Laughter) I'm talking about the larger numbers that I showed you later.

The fastest supercomputers today won't be able to find the factors before the end of the world, but quantum computers can easily factor them, and even much larger numbers.

To protect you and me from hackers, a quantum computer would break all the cryptography in use today.

easy to pull off

In other words, if quantum computers are a spear, then the modern, unbreakable encryption that has protected us for decades is a shield made out of tissue paper.

Anyone with access to a quantum computer will have a master key, the key to unlocking anything they want in the digital world.

They could steal money from banks and control the economy.

We could turn off hospitals and set off atomic bombs.

We could also be able to spy on everything that our webcam is filming without our noticing.

Now, the basic unit of data that all the computers we use every day deal with is called a bit.

A bit is represented by one of two digits - either 0 or 1

If I was on FaceTime with my mother far away, she would look at this slide and try to kill me.

Bits are really helpful

On the contrary, all current technology benefits from the usefulness of bits.

But I've found Bitt to be very bad at simulating complex molecules and particles.

Because, in a way, subatomic physics follows the strange laws of quantum mechanics, doing two or more things at the same time.

At the end of the last century, some very bright physicists came up with an ingenious idea: to build a computer that followed the laws of quantum mechanics.

Now, the basic unit of data handled by a quantum computer is called a Qbit (quantum bit).

stands for "quantum bit"

Instead of being limited to just two states, like 0 or 1, qubits represent an infinite number of states.

And this corresponds to multiple states that are both 0 and 1 at the same time, a phenomenon called superposition.

So if you have two qubits in a superposition, you're dealing with a combination of four states: 0-0, 0-1, 1-0, 1-1.

So if you have three qubits, you're dealing with a superposition of eight states, and so on.

Each additional qubit doubles the number of combinations that can be superimposed at the same time.

As the number of qubits increases, the number of combinations that can be handled simultaneously increases exponentially.

And that's exactly where we got a hint of the hidden power of quantum computing.

Now, in modern cryptographic systems, the secret key, the two factors that make up a big number, is just a long string of numbers made up of 0's and 1's.

To find a factor, a classical computer would have to try all the combinations one by one until it finds the only combination that breaks the cipher.

But with a quantum computer, if you have enough qubits in a superposition, you can extract information from all combinations at the same time.

In just a few steps, a quantum computer can ignore all wrong combinations and pick just one correct answer to unlock our precious secrets.

Something amazing is happening right now on a strange quantum level.

According to the conventional wisdom of many leading physicists -- and I need you to believe this myth with me -- each combination is tested by a parallel world inside a quantum computer.

Individual combinations add up like waves in a pool.

Wrong combinations cancel each other out

The right combination reinforces each other

And at the end of the quantum computing program, all that's left is the correct answer, and we can actually check the correct answer.

Don't stress if you don't understand this explanation

(Laughter) I have a lot of friends.

Niels Bohr, one of the pioneers in this field, once said, "People who can think of quantum mechanics without being horribly shocked don't understand it."

(Laughter) But you now understand why the problems we face and the solutions to these problems depend on cryptographers.

We have to solve this urgently, because quantum computers are already in laboratories around the world.

Luckily, at the moment we only have relatively small ones, too small to crack much larger cryptographic keys.

But it won't be safe forever

Some believe that a secret government agency is already building something big enough to keep it secret.

Some experts say it's still a decade or more away.

Some say 30 years away

You might think that if it takes 10 years for quantum computers to become practical, there's plenty of time for cryptographers to find solutions and secure the internet.

But unfortunately it's not that easy

If we set aside the long years it takes to standardize and deploy new encryption techniques, it may already be too late.

Smart digital criminals and government agencies may already be stealing encrypted top-secret data in anticipation of the quantum future.

Foreign leaders, generals, personal messages questioning power are now encrypted.

But as soon as someone has a quantum computer, they will be able to go back in time and crack any code.

Some governments, financial institutions, and military agencies have kept classified information private for 25 years.

If quantum computers really arrive in 10 years, we're already 15 years behind in secure cryptography for quantum technology.

While millions of scientists around the world are racing to develop a quantum computer, we cryptographers are scurrying to develop cryptography that can protect people long before that day arrives.

We are looking for new math problems that are difficult to solve.

I'm looking for math problems that can be used on modern smartphones and laptops, like factoring problems.

But unlike factorization, we have to make the problem so difficult that even a quantum computer can't solve it.

In recent years, we've been digging into the wider field of mathematics, looking for such problems.

What we're looking for are numbers and objects that are different and more exotic and abstract than what you might be familiar with on a calculator.

We believe we've found some such ingenious geometric problems.

Now, most of these problems are well over 500 dimensions, unlike the two- and three-dimensional geometric problems we had to solve in high school with pen and grid paper.

So, not only is it a little bit harder to draw on grid paper, but I believe it's a problem that even a quantum computer can't solve.

It's still early days, but here's our hope to protect our digital world for a future dominated by quantum.

Cryptographers, like other scientists, are very excited about the world's possibilities for harnessing quantum computers.

There may be such a power that can be used forever

But whatever the technological world of the future, secrets are part of human nature.

it's worth preserving

thank you

(applause)

As you can see, I only have a beard on one side of my face.

I'm not doing this after losing a bet.

long ago i got a bad burn

I have scars all over my body, including the right side of my face.

I can't grow a beard, so it's not symmetrical.

So much for the beard, let's talk social science.

What I really want to think about is how much potential humans have and where we are right now.

There's a huge gap between what's possible and what's happening, and it's true in all areas.

So I want to ask you, how many of you think you've eaten too much in the past month?

everyone is right

Who thinks you haven't exercised enough in the past month?

Who said raising your hand twice was the best exercise of the day?

(Laughter) Who ever texted while driving?

Everybody's being honest Let's test your honesty

Has anyone in the past month gone to the bathroom and not washed their hands?

(Laughter) I lost my honesty.

It's interesting that people can admit to texting while driving, but not to admit not washing their hands.

(Laughter) I could go on and on.

The bottom line is that it's often the case that what we think we should do is not what we're doing.

What we often do to fill this gap is simply point it out.

"It's dangerous to text while driving"

"Do you know it's dangerous?"

If you say it's dangerous, everyone will stop

Email while driving is an example

Another unfortunate example is that in the United States, 700 to 800 million dollars a year is spent on "financial literacy."

What is the result?

There's a recent study that summarizes previous research on financial literacy, and it's called a meta-analysis.

What I learned is that when you teach financial literacy, people learn

If you're going to practice it, it means that you don't do it very often.

It improves by 3-4% immediately after the training, but then declines.

The final improvement is 0.1%, not zero, but very close to zero.

(Laughter) It's a shame

Giving information is not a good way to change people's behavior.

Then what should I do?

There's a lot of knowledge in the social sciences, but one basic thing is that if we want to change people's behavior, we need to change the environment.

The right thing to do is change the environment, not the person.

As a simplistic model for thinking about this, let's compare behavior change to a space rocket.

There are two big things to do

reduce resistance in the first place

I want to reduce the resistance as aerodynamically as possible

Second, put in as much fuel as possible to increase your motivation or energy to do the task.

It's the same with changing behavior.

resistance in the first place

As an example, consider the online sale of drugs.

I have a long-standing illness

Get a doctor to prescribe your medicine, then go to an online pharmacy to make a regular purchase.

Medicines will be delivered every 3 months

This online pharmacy wants people to switch from branded drugs to generic drugs.

So I write a letter and say, "Please switch to generics.

It saves you, the company, and your employer money.”

So what do we all do?

do nothing

Even if you change hands and change products, nothing will happen.

So I'm going to run a bold campaign.

“If you switch to generic now, it will be free for a year.”

It's a great deal

How many people do you think made the switch?

Less than 10%

At that point, the pharmacy came to consult me.

I complained

why did you come to me

Because I was writing a paper on "The Allure of Free."

The paper showed that even if the price was lowered from 10 yen to 1 yen, there was not much reaction.

If you change from 1 yen to free, everyone will jump on it.

(Laughter) So they say, "We read that paper, we made it free, and it didn't do what we expected.

What do you mean? "and

"It may be a matter of resistance," I replied.

I asked him what he meant, so I explained

“If you start with a branded drug,

If nothing is done, it will remain a branded drug.

When it comes to generics, it's not just about choosing generics versus branded drugs.

It takes time to reply to the letter."

This condition is called "confounding"

two things happening at the same time

There's the difference between "branded drugs" versus "generic drugs" and "doing nothing" versus "doing something."

So I said, why don't you replace it?

"Switching to generic drugs

you don't have to do anything

If you want to continue with the branded medicine, please reply." (laughs)

what do you think happened?

lawyer came out

(Laughter) Actually, it was illegal.

(Laughter) I don't mind doing things that are illegal or unethical, as long as they're for brainstorming and creativity, as long as you don't do it.

(Laughter) But that's where the problem lies.

In my illegal and unethical way, generic drugs have a no-action advantage.

I ended up presenting the client with a T-junction, saying, "If you don't respond, we'll have to stop giving you medicine.

If you send me a reply, I can choose between a branded drug at this price or a generic drug at this price."

Everyone will be called upon to act

conditions are equal

Neither has the advantage of no action

What percentage of people do you think have switched?

most people switched

What will we learn from this?

Do people prefer branded or generic drugs?

I mean, people don't like replying to letters.

(Laughter) It's about resistance, and it's the little things that matter.

What is the resistance to the desired behavior that makes everyone hesitate to do it?

When the conditions for desirable behavior and easy behavior are not aligned, it's important to get them aligned.

I talked about the first part, resistance.

Now let's talk about motivation.

In a study we did, we tried to encourage poor people living in the slums of Kibera, Kenya, to save money for emergencies.

If you're very poor, you can live from hand to mouth with no extra money, but sometimes bad things happen.

And when bad things happen, you don't have any savings, so you go into debt.

People in Kibera can borrow money at interest rates as high as 10% a week.

then it's hard to get out

You live day to day, something bad happens, you go into debt, things go from bad to worse.

That's why I wanted him to save a little money just in case.

I thought about what would motivate me and what fuel I should add.

tried various things

I email some people once a week and say, "Let's save $100 this week."

I send some people emails that look like they're from my kids.

"Mom, Dad, it's Joey. I'll put your child's name here. Please save $100 this week for your family's future."

As a Jew, a little bit of guilt works for me.

(Laughter) I'm going to give some people 10 percent money.

"We will give you 10% of your savings up to 100 yen."

Offer 20% money to some people

We offer some people 10%, 20% money, but we add an element of loss aversion.

What is loss aversion?

The feeling of hating loss is stronger than the feeling of being happy about gain.

Let's say someone saves 40 yen with a 10% condition.

You get 4 yen for 40 yen and you say thank you.

I missed the opportunity to get another 6 yen.

If I had saved 100 yen, I could have earned another 6 yen.

So I tried the prepayment method.

At the beginning of the week, I will put 10 yen in my bank account.

"Money is waiting"

Then, when the other person saves 40 yen, I say, "Since it's 40 yen, I'll leave 4 yen and ask you to return 6 yen."

That's why you receive 10% the same regardless of whether you pay in advance or pay afterward.

However, in the case of the advance payment method, the amount that does not meet the savings amount will disappear from the account.

Email Email from child 10% 20% Pay in advance Pay later

I prepared one more pattern.

A coin this size has 24 numbers written on it.

Hang it up somewhere in your house, and every week you carve out the numbers for that week with a knife.

Which of these methods do you think was the most effective?

Email Email from child 10% 20% Prepaid Postpaid Coin

I'll let you know what the average person thinks

We conducted research for this prediction in the United States and Kenya.

For most people, the 20% works best, the 10% works next, and the others don't work with children's mail or coins.

I don't think loss aversion has much impact

How did it actually go?

It was effective to email every week

Sounds good

In a six-month program, people tend to forget, so it's good to remind them.

It's even more effective to offer 10% at the end of the week.

Financial incentives work

20% at the end of the week is no different than 10%

It's even more effective to offer 10% at the beginning of the week.

The feeling of loss aversion works

Giving 20% ​​at the beginning of the week is no different than giving 10% at the beginning of the week.

Emails from children were as effective as 20% of loss aversion, which is amazing.

It's amazing how motivating an email from a child can be.

One of the conclusions is that we're not making the most of our children.

(Laughter) Of course, we're not talking about child labor.

When it comes to parents and children, we can do what's best for our children and think about the future. So maybe we should think about how we can use this powerful motivator to encourage good behavior in our parents.

The big surprise in this study was the coin.

The coin was twice as effective as the others.

Where in the coin is that power?

Let me tell you how I started thinking about coins, and then I'll get back to you.

If you want to know how to buy coffee, you don't have to go anywhere.

I've bought coffee many times

I know what it's like

But when you're researching the poorest neighborhoods in the world, you have to go there and see what's going on and get insight into how those places are made.

I once saw funeral insurance for sale in a place called Soweto, South Africa.

In America, people spend ridiculous amounts of money on weddings.

In South Africa, we spend money on funerals.

Spend a year or two of your annual income on funerals.

Before you all say that South Africans are irrational, I want to point out that if you spend money on funerals instead of weddings, you only have to do it once.

(Laughter) I saw funeral insurance being sold there.

A man came in with his 12-year-old son and bought a week's worth of funeral insurance.

If you die within 7 days, 90% of the funeral expenses will be paid.

They're very poor, so they buy very little of everything, whether it's insurance or soap.

With the insurance policy in hand, the man pompously hands it over to his son.

I wondered why you gave it to me in such a ritual.

what is this father doing

If the breadwinner of the family decides to put the money into insurance and savings,

What will the family see that night?

Decrease

At this level of poverty, you're going to have less food, less fuel, less water.

This father's act and our coin show that food is scarce, but there are alternatives.

Saving money and insurance are important economic activities, but there are many invisible things.

How can I make it visible?

Let's go back to the rocket model.

First, we look at the system to see if there's a way to remove the resistance.

And then I think about the bigger picture of the system and what other motivations it brings.

It's not easy, and we don't always know what works best.

Money or loss aversion?

Is it visible

I don't know, I'll have to try

We also need to be aware that our intuition is prone to error.

I don't know what works best

It's unfortunate that there's a gap between what we should do and what we're actually doing.

But the good news is that there's a lot you can do.

Sometimes it's easy to change, sometimes it's hard

But if you don't just address individual problems directly and provide information, but if you change areas of resistance and add motivation, even if you can't completely eliminate the gap.

could be much better

thank you

(applause)

Hephaestus, the god of technology, was devoted to his most ingenious inventions.

He was creating a new defense system for King Minos to reduce intruders into the Kingdom of Crete.

But human guards and common weapons weren't enough, so an imaginative god created an indomitable new bodyguard.

With the fire of the forge, Hephaestus transformed his invention into a giant.

Made of shining copper, possessing superhuman strength and powered by the elixir Ichor, the lifeblood of the gods, this automaton was unlike anything Hephaistos had made before.

He named this creation Talos, the first robot.

Copper guardians circled the island three times a day to find intruders.

When he noticed a ship approaching shore, he threw a huge rock in its path.

When survivors reached land, he would red-hot his metal body and crush his victims with his chest.

Talos' role was meant to be a consistent day-to-day task.

But despite his mechanical demeanor, he harbored a soul that even his victims couldn't imagine.

And soon you'll encounter an intruder ship that will put your giant's mettle to the test.

Jason, Medea, and the crew of the Argo, in dingy garb, were returning from their hard-earned journey to the golden sheepskin.

Having survived so many trials in their adventures, the exhausted crew tried to find some way to rest on the safe shore.

They had heard tales of an invincible copper giant on Crete, so they headed for a walled cove.

However, Talos spotted him before he could set down his anchor.

While the crew of the Argo were horrified by the terrifying automaton, Witch Mediah spotted a glowing bolt in the robot's ankle and struck up a clever negotiation.

Medea made a deal with Talos. She said she would make Talos immortal in exchange for removing the bolts.

The promise of the media resounded in his soul.

Oblivious to his mechanical nature, yet human enough to yearn for eternal life, he agreed.

Jason removed the bolt while Medea cast the spell.

The bolt was a design flaw in Hephaestus, as the media had vaguely noticed.

Ichor overflowed like molten lead, draining Talos' energy source.

The robot fell with a roar, and the Argo crew was able to return home.

First recorded around 700 B.C., the story raises well-known concerns about artificial intelligence, and even provides a blueprint for how the ancients drew science fiction.

But according to historians, ancient robots were more than myths.

By the 4th century BC, Greek mechanics were actually making automatons, like robot servants and models of flying birds.

These inventions were not as well-known as Talos, which was depicted on Greek coins, on pot paintings, on wall frescoes, and in theatrical performances.

Even 2,500 years ago, the Greeks were already thinking about the uncertain boundaries between humans and machines.

And like modern myths about artificial intelligence, the story of Talos was both about a machine brain and about a machine mind.

A 5th-century BC depiction of the death of Talos depicts the despair of a dying automaton with tears streaming down its copper cheeks.

Think about claws

Found in many four-legged animals around the world, it's one of nature's most versatile tools.

Bears use their claws for digging and defense.

The hawk's needle-like claws can pierce the skull of its prey.

Lions can stow their huge claws during peaceful movements and flash them out when hunting.

Even our primate ancestors used this amazing appendage until claws evolved into claws.

So what in evolution led to this beautiful adaptation to nails, and what can claws do that sharp claws can't?

The oldest fossilized claws are about 55.8 million years old, but by this time, 260 million years had passed since claws first appeared in the ancestors of mammals and reptiles.

Both of these adaptations evolve in the same way, despite the long intervals between the emergence of these claws.

Both nails and claws are made of keratin, a tough, fibrous protein that is also found in horns, scales, hooves, and hair.

This protein is made in the nail matrix, a wedge-shaped tissue.

Rich in blood vessels and nutrients, this protein factory is constantly producing keratin and is densely packed into cells called keratinocytes.

These dense cells give nails and claws their characteristic toughness.

Nails evolved from claws, so they make keratinocytes in the same way in both adaptations.

Keratinocytes grow from the nail matrix, emerge from the skin to the superficial layer, and after they die, form a hard, waterproof covering.

The only major difference between the two types of keratin coverings is the shape, which depends on the shape of the animal's fingertip bones.

In the claw, the nail bed of keratinocytes is shaped to fit the narrow finger bones, wrapping around the fingertip and radiating outward to create a mortar-like structure.

Clawed animals, on the other hand, have wider digits, and keratinocytes cover only the top surface of the broad bones.

It's possible that it simply continued to exist as a side effect of the evolution of primate digits into wider, more dexterous digits.

But based on what we know about the habitats of our primate ancestors, it's more likely that claws had inherent advantages.

In the forest canopies where primates lived, wide finger bones and wide finger pads were ideal for grasping thin branches.

And the claws have further enhanced their grip

Given a solid surface to press against, the primates expanded their finger pads, giving them more contact with the tree.

The claws also improved the sensitivity of the fingertips by increasing the area that feels pressure changes during tree climbing.

This combination of sensitivity and dexterity gave our ancestors precise motor control for catching insects, pinching fruits and seeds, and grasping thin branches.

There is a close relationship between the evolution of the nail and the evolution of the thumb facing the other fingers.

And when our ancestors descended from trees, the ability to have a flexible grasp enabled them to build and manipulate complex tools.

Even if broad fingers could mutate into claws, the sharpness of the claws would have interfered with the primate's daily life.

Claws are ideal for piercing, puncturing, and hooking, but their sharp points can make gripping things difficult and dangerous.

But both claws and claws are used in unexpected ways.

Manatees use their claws to grab food, and researchers believe that elephant toenails help us hear by detecting vibrations in the ground.

On the other hand, primates such as the Madagascar aye-aye have reacquired claws.

They use these very long appendages to peck at branches and trunks, and use their bat-like ears to locate cavities.

When it hears the hollow, it digs a hole in the tree and pricks a maggot with its needle-like middle finger.

We've seen very few amazing uses of claws and claws in the animal kingdom.

But which adaptation is better?

You could say it hides its claws

The old saying about climate protection is that it costs money and it's already happening.

If you don't do something painful, you can't protect the climate.

But there's a new theory that climate protection isn't costly, it's profitable.

They got a simple mistake because, as companies like DuPont and STMicroelectronics have known for a long time, saving fuel is cheaper than buying fuel.

Many other companies, like IBM, are also renovating their factories to reduce their energy consumption by 6 percent each year, and they're paying back their investment in a few years.

I call it profit

It's the same with oil, and it used to be said that if you bought a lot less oil, it would cost you money, or if you could do it, you'd already done it, because the market is basically perfect.

If that were true, there would be no innovation and no one would make money.

But what's being said about oil now is that we don't have to suffer at all to get out of oil, and vice versa. For example, the United States could, under the leadership of commercial corporations, stop using oil entirely and at the same time revitalize its economy, because it's a lot cheaper to save oil and replace it with something else than to keep buying it.

This process will also be driven by the military for its own reasons: for combat effectiveness and to prevent conflicts over oil.

This claim is presented in a book called "Getting Off Oil," which I wrote with four colleagues and made available to read for free on Oilendgame.com, which has had 170,000 downloads to date.

It's funded by the Pentagon, but it's an independent, peer-reviewed publication, and all the formulas under discussion are open for anyone to scrutinize.

Let me tell you a little bit of economic history that might be useful.

Around 1850, one of America's biggest industries was whaling.

Whale oil was actually lighting up all the buildings.

But in the nine years before Drake found the oil field in 1859, at least five-sixths of the market for whale oil used for lighting had disappeared because of rivals such as oil and coal-derived gas that whalers didn't care about.

And they didn't expect it at all, but before the whales were gone, the customers were gone.

The remaining whales were saved by tech innovators and profit-maximizing capitalists.

(Laughter) It's funny, I feel like the same thing is happening with oil right now.

Over the last few decades, we've accumulated a powerful array of technologies to conserve and replace oil, but no one has tried to integrate them.

When I did that, I found something amazing.

There are two main reasons why we care about oil.

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.

There is also serious competition from Europe and South Korea, followed by China, which will soon become a major exporter of cars.

How long do you think it will take you to drive home in a super fuel-efficient car from Shanghai with a cool badge?

According to my friend in Detroit, maybe 10 years.

China's energy policy is based on radical energy efficiency and rapidly developing technology.

We won't export a car like your uncle's Buick.

After China comes India

The point is that these cars will be made to be super fuel efficient.

The question is who makes

Will those of us in America continue to import fuel efficient cars to save foreign oil, or will we build our own fuel efficient cars and avoid importing oil and cars?

that seems more reasonable

The more we use oil, especially imported oil, the more problems we face.

Our analysis assumes they don't cost anything, but zero is not the right number.

For example, oil prices could well double.

In the worst case, it could affect America's position in the world. If we treat oil-producing countries differently than non-producing countries, the rest of the world will think that America is all about oil.

Military men, who enlisted to protect the American people, would be very reluctant if they somehow had to protect the pipelines far away in Stan.

They don't want to fight over oil, they don't want to be in the sand, they don't like where oil money ends up and the instability it creates.

However much we value these problems, the ways to avoid them are not complicated.

You can cut your usage in half just by using oil more efficiently at a cost of $12 per barrel saved.

The other half can be replaced by advanced biofuels and safe natural gas.

They average less than $18 a barrel

Compare that to the official forecast that oil will cost $26 a barrel in 2025 — only half the price it was recently — and you could save $70 billion a year if you started right away.

To make this happen, we need an investment of $180 billion, half to retool the car, truck and airline industries, and half to build a modern biofuels industry.

In the process, about a million good jobs were created, mostly in rural areas.

Another million jobs currently at risk, mostly in car manufacturing, could be saved.

It should also generate more than $150 billion in returns per year.

that's a pretty big return

Can be financed in the private capital market

But if, for the reasons I just mentioned, you want it to happen sooner and more reliably, and if you want to increase your options and manage your risks, you might be better off with smart public policy that supports the logic of business rather than undermines it.

Those policies work without taxes, subsidies, mandates.

I'm going to put a little money in the treasury

Such a policy would have cross-ideological appeal, and we wanted it to happen, so we figured out a way to do it without requiring too much federal law, which could actually be done administratively or at the state level.

At the heart of the problem, which is what we're going to do with a small passenger car, in a nutshell, here are four ultra-light carbon composite, low-drag concept cars, all but the one on the top left, which has a hybrid drive.

These cars have it all

For example, this Opel two-seat car can go 155 miles an hour with 94 miles per gallon of gasoline.

This Toyota behemoth has 408 horsepower, but it's super light, can go from 0 to 96 kilometers per hour in less than four seconds, and it burns 32 miles per gallon -- more on that later.

At the top left is GM's pioneering effort from 14 years ago, not a hybrid, but a four-seat, 135-kilometer-per-gallon car.

Saving that fuel, which is 69 percent of light-duty car fuel, costs 57 cents per gallon saved.

Things are even better for heavy trucks, because with better aerodynamics, tires, engines, etc., you can save the same amount of fuel at 25 cents a gallon, and you can save the same amount on your cargo by saving weight.

So you could double the efficiency and get a 60 percent internal rate of return.

And if we push for operational improvements and things like that, we can triple our efficiencies and double our margins for major carriers.

We use these numbers to create demand traction and stimulate the market.

The same is true in aviation, where Boeing is demonstrating with its new Dreamliner, 20 percent free fuel savings.

The next generation of planes will save about half the fuel.

It's still a lot cheaper than buying fuel.

In 15 years, we'll have fusion wing airframes, sort of flying wings with internal combustion engines that could triple efficiency for the same or even lower cost.

Now let me talk a little bit about small cars and small trucks, because what we know best is cars, and probably everyone here drives a car.

But what you may not know is that in a typical sedan, seven-eighths of the fuel energy you put into it doesn't make it to the tires, and is either lost inside the engine or used for idling, powertrains and accessories.

And of the one-eighth of the energy that goes to the tires, half is used to heat the tires on the road and the air that the cars are pushing away.

Only 6 percent is actually used to accelerate the car or heat the brakes when stopping.

In fact, 95% of the weight moved is the car, not the driver, so less than 1% of the fuel energy is used to move the driver.

After more than a century of intense engineering effort, it's not very satisfying.

(Laughter) (Applause) Three-quarters of fuel use comes from the weight of the car.

What is clear from this figure is that if we save energy in the tire, we also avoid wasting energy in other units that bring energy to the tire.

Making a car lighter has a huge impact.

The reason this hasn't been taken very seriously in the past is that there was a common belief within the industry that light cars were less safe when hit by heavy ones, and that they were much more expensive to produce.

But these objections are disappearing as materials evolve.

For example, many carbon composites are used in sporting goods.

They are known to be extremely safe

This is a hand-built McLaren SLR carbon car that was side-impacted by a Golf.

Golf has been completely destroyed

McLaren just popped up and scratched the side panel

Just put it back where it was and heal the wound later and you're done.

If this McLaren were to hit a wall at 105 kilometers per hour, all of the crash energy would be absorbed by a cone of woven carbon composite weighing about seven kilos at the very front of the car.

These materials can actually absorb 6 to 12 times more energy per pound (450 grams) than steel, much smoother.

So we've broken through the safety and weight conundrum.

We can make cars bigger, more protective, and lighter at the same time.

On the other hand, if you make the car heavy, it's dangerous and inefficient.

If you do the right things to lighten your car, it will be simpler and cheaper to build.

As a result, you save money, you save oil, you save lives.

Two years ago, I showed you here a basic, no-compromise, five-fold-efficiency attack vehicle design.

Everything you need to make it is becoming available on the market.

We figured that some kind of digital inkjet printer would be good for this very stiff, strong carbon composite, and then we found a way to age it, because it's made of carbon and nylon composites, and you can make it into any kind of complex shape you see at the auto show from a leading supplier.

Manufacturing done this way has become extremely simple.

The body of a car is made up of only 14 parts, not 100 or 150.

Each part is made with a very cheap set of dies, not four expensive sets like those used to stamp steel.

Each part can be easily lifted without using a hoist.

Put together like a child's toy

I don't need a repair shop

You can also pour the color into the mold and eliminate the need for a painter

These are the most difficult and expensive steps in the production of a car.

It will be at least two-fifths less capital-intensive than the industry's most efficient plant that GM has in Lansing.

and the factory will be smaller

The government says a similar analysis for all of our oil uses, from buildings to industry to raw materials, will be needed in 2025. Of the 28 million barrels of oil a day, 8 million barrels will be eliminated through efficiency gains, and 7 million barrels will be saved by selling car inventories at an average of only $12 per barrel, saving $26 to buy oil.

And 6 million barrels will be consistently produced from cellulosic ethanol and some biodiesel without impacting the water and land needed for grain production.

Massive Gas Savings About half of projected gas usage can be saved for as little as one-eighth of the price

There's still some leftovers, but this is a simple alternative to oil.

So if we adjust our domestic oil use projections using the areas that have already been approved, we are left with very little. Let's see how we can meet that demand.

You could buy oil more efficiently

Maybe we should spend $26 instead of $12 to buy efficiency

Or you can wait for oil to hit $12

And with this little oil needed, we can continue to import some from Canada and Mexico, and we can buy the ethanol that Brazil wants to sell.

But Brazil will sell to Japan and China, because the US has tariff barriers to protect corn farmers, but they don't.

Or we can use the gas we save directly to meet our fuel needs, or if we use the gas as hydrogen, it's more profitable and efficient, and we could also stop using domestic oil.

What's more, if you take land in, say, the Dakotas, it's cheap and you can get enough wind power to drive every car on the highway.

you have a lot of choices

Very flexible when and what to choose

There are several things governments can do to make these things happen faster and more reliably.

For example, if we could create a charge-and-refund system for any size car, we could raise the price of a less fuel-efficient car, and at the same time give a refund to a more fuel-efficient car.

You are not paid for changing the size of your car

For choosing the same size, but more efficient car, and getting reimbursed for the fuel savings over the entire lifecycle, 14 years instead of the first few years.

This opens up a lot more choice in the market, and it's going to make more money for automakers.

I want to do something about the lack of affordable personal transportation in this country. I want to make it possible for people in low-income families to buy fuel-efficient, reliable, and guaranteed new cars at prices they can't get anywhere else.

For each such car, one junk car will be scrapped.

This will allow Detroit to sell one million new cars a year, creating a market for customers who were previously excluded because they lacked the creditworthiness to buy a new car.

Every corner of Detroit will start making money

If black and white families had the same number of cars, it would provide better job opportunities and cut the employment gap in half.

This is also a big win for society.

The government buys millions of cars each year

Buy smarter and increase your purchasing power to bring fuel efficient cars to market faster

We could go even deeper with an X-Prize scheme to raise the prize.

For example, giving a $1 billion prize to the first automaker to sell 200,000 of the really advanced cars you saw earlier.

Traditional airlines say they desperately need to cut their fuel bills and can't buy new, more efficient planes, but if you're philosophically willing to do something about it, there are ways to finance it.

At the same time, we have to let go of the old inefficiency expectations, or else the old planes will fly again, and we'll be wasting more oil, which will wipe out what the new fuel-efficient planes have earned.

It's better to dispose of such past fuel-efficient aircraft than to continue to use them.

Take them to the back, shoot them, and let the bounty hunters go after them.

Then there's the important role that the military plays.

It's pushing the transition to high-capacity, low-cost materials and ultra-lightweight steel, and I'm talking about superior assistive technology -- the military can do what they once did with the DARPAnet turned into the Internet.

We just handed it over to the private sector and it became the Internet.

Also about GPS

The same is true for the modern semiconductor industry.

In other words, military science and the technology it requires can create a collection of advanced materials and industries that will transform the civilian economy and move America off of its dependence on oil.

We also need to retool and retrain the automotive industry, we need to converge the energy and value chains, we need to accelerate the transition from hydrocarbons to carbohydrates, we need to reorient ourselves.

It makes the transition to more efficient cars faster.

How do all these things connect

The official forecast for oil use is that oil imports will continue to rise, but that could be lowered by an efficiency of $12 a barrel. Add in supply-side substitution at $18, and it would drop even more sharply, cheaper than the last time this story sparked interest.

If we start using a little bit of hydrogen, oil imports will drop rapidly, and by the 2040s we'll be completely oil free.

One thing I would say is that we have done this before

In the eight years from 1977 to 1985, the last time oil was in the spotlight, the economy grew 27 percent, oil use fell 17 percent, oil imports fell 50 percent, and oil imports fell 87 percent from the Gulf.

If it had continued for another year, it would have disappeared completely.

We were able to do that using old technology and delivery methods.

I can do much better now

What was shown at that time was that America had more power in the market than OPEC.

we are on the demand side

Saudi Arabia is in the no-oil position, and they can use less oil at a faster rate than they can sell less oil.

(Applause) No matter what reason you want to do this, whether it's national security or price volatility.

please download the paper thank you

(applause)

Now I'm going to talk about myself, which rarely happens, because first of all, I prefer to talk about things I know nothing about.

And I'm also trying to fix my own narcissistic behavior.

(Laughter) I never knew I was a narcissist.

I thought it meant that I loved myself

But I learned that it means something else.

It actually meant something more dreary than self-love, because it meant unrequited self-love.

(Laughter) Sorry for the recurrence.

But I'd like to talk about how I developed my own comedy, because it's been through a lot of transitions.

We started with improvisation, a form of improvisation called theater games. There is one rule, and I think it's a great rule for social ethics.

It's a rule not to deny other people's reality.

We live in a society where it's all about contradicting other people's realities.

Contradictions are everything, and I'm very sensitive to contradictions.

because it can be found everywhere

Take polls, for example, and it's always been interesting to me, because the percentage of Americans who say "I don't know" to any poll question is consistently two percent.

75% of Americans think Alaska is part of Canada

Only 2% of respondents say they don't know what the collapse of Argentina will do to IMF monetary policy.

Or this ad from the New York Times, "A fine watch makes a statement."

If you buy it in our shop, the good taste will tear your ears apart."

(Laughter) I think it's an article I found in a magazine called "California Lawyer," specifically directed at Enron lawyers.

"Survive in Prison: Dos and Don'ts"

(laughs) "Don't use exaggerated words."

(laughs) "Learning the lingua franca"

(Laughter) That's right. "Frankie, lick it."

(Laughter) Maybe it's a contradiction for me to talk about science when I don't know math.

I am very grateful to Dean Kamen, an American inventor, for pointing to cultural reasons as one of the reasons why women and minorities are not engaging in science and technology.

When I read "Snow White and the Seven Dwarfs" when I was six years old, I quickly learned that there are only two kinds of men in the world: dwarfs and lovely princes.

The odds of finding the prince are 7 to 1.

(Laughter) That's why girls don't do math because it's too depressing.

(Laughter) Of course, by talking about science, I got angry with some scientists, like I did one night, and they really hated me.

The use of the word postmodern with no problem

I seem to have turned them upside down.

One of them -- I think, to his credit, just wanted to have a serious discussion with me.

But I won't take part in serious discussions

I don't think it makes sense, because arguments are always about contradictions and are based on values ​​that I question.

I question the values ​​of Newtonian science, such as rationality, and arguments require rationality.

What builds rationality, as Christie Hefner said today, is the separation of mind and body.

The head is good and the body is evil

The head is the ego and the body is the id

As Rene Descartes said, "I think, therefore I am," when we say "I," we are talking about the head.

David Lee Roth sang "I don't have a body" in "Just a Gigolo"

that's how you get rationality

A lot of the humor is in the body versus the head.

So there's a lot of toilet humor, a lot of sexual humor.

So when the Raspini Brothers (famous jugglers) whip Richard's vitals,

We laugh doubly, because he's the body, and at the same time, behind the scenes: "Richard."

Levine: "Did you say me, Richard?"

(Laughter) That's Richard, and he's also the head of this conference.

And that's another funny thing, like Art Buchwald satirizing the state bosses.

It certainly doesn't make as much money as body humor. (Laughter) But it's what makes us care and love you.

There's a contradiction in rationality in this country, a country that worships leaders and is also very anti-intellectual.

I know from reading The New York Times, this is a full-page ad from the Ayn Rand Foundation, after 9/11: "The problem is not Iraq or Iran, the problem facing this country is professors and their eggs."

(Laughter) So I went back and reread Rand's "Water Source."

(Laughter) I don't know how many of you read it.

I'm not an SM pro

(Laughter) Let's read a few random lines from page 217.

"The man's demeanor, his master's humiliating and disdainful possession of his slave, was the kind of ecstasy she wanted."

"The way they are in bed is as violent as it always was, as the nature of the act demands."

"And the act is an act of clenched teeth and hatred.

It's intolerable, it's a struggle

It is also an act of passion.”

So you can imagine my surprise when I read The New Yorker that Alan Greenspan, Chairman of the Federal Reserve, said that his intellectual mentor was Ayn Rand.

(Laughter) It's like realizing that your nanny is Queen Sade.

(laughs) J. Even just being forced to see Edgar Hoover (the first FBI director) dressed as a woman was pretty terrible.

Now I can imagine Alan Greenspan in a black leather corset with a tattoo on his buttocks that says, "Immediately whip inflation." (Laughter)

Ayn Rand, of course, is known for his idea of ​​objectivism, but it reflects another value of Newtonian physics: objectivity.

Objectivity is basically built the same as SM

the subject conquers the object

That's what self-assertion means

Become the active voice

The subject becomes passive and no-voice.

I was obsessed with that oxygen commercial.

I don't know if you know, but maybe it's different now, and maybe they used to say that. Until recently, in many hospital nurseries in this country, Jessica Benjamin's book said, "I'm a boy!" above the boy's crib and "It's a girl!"

Culturally, passivity is projected onto even newborn girls.

As I said last year, the trend is still continuing.

There's a poll to prove it. It's a poll by Time magazine. It's only for men.

That's right

58% said yes, and I think that number is inflated, because far too many men just say, "I've had sex..." and they say, "Yes!"

I don't even listen to the question to the end

(Laughter) And, of course, 2 percent don't know if they've ever had sex.

(Laughter) Now, this subject-object thing is part of what interests me so much, because it's the background to my belief in political correctness.

Sometimes I go too far

I think the New York Times advertisement for the Linlin Brothers (one of the three biggest circuses in the world) goes too far.

“We have a lifelong emotional and financial commitment to our Asian elephant partners.”

(Laughter) Maybe I'm going too far, but I don't think that people of color making fun of white people is the same as white people making fun of people of color.

Or a woman laughing at a man is different than a man laughing at a woman.

So are the poor and the rich

It's okay to ridicule the haves, but not the have-nots, so there's no way I'm making fun of Kenneth Lay and his charming wife.

(Laughter) It's not funny that I only have four houses left.

(Laughter) I really learned this during the Clinton presidency during the sex scandal, or what I call the good old days.

(Laughter) So-called self-progressive and assertive people were making fun of Jennifer Flowers and Paula Jones.

(Both are central figures in the Clinton scandal.) They ridiculed them for being poor people in trailers, poor white people.

It's a harmless prejudice, I think, and it's not meant to harm anyone in particular.

Until I read an ad I saw in the Los Angeles Times.

"For Sale: White Trash Compactor"

(Laughter) So this whole subject-object story has to do with humor in this way.

I read a book by a woman named Amy Richlin, who is a professor of classics at USC.

The name of the book is "The Garden of Priapus"

She said that Roman humor mirrored the fabric of Roman society.

Roman society was either extremely high or low, and so is ours to some extent.

so was the humor

A joke must have a butt

Satirists like Juvénard (a Roman satirist) and Martialis (a Latin poet) make fun of outsiders on behalf of their audience, people who don't have the status of subject.

And, of course, in stand-up comedy, the comedian has the upper hand.

The reason why comedians tease the audience so often is because it's a tension to ensure that the audience is overwhelmed, and to overwhelm the hecklers.

I used to do standup and I got better at it

I've always hated it because it dominates the interaction with the audience, which is similar to how engaging in a serious discussion determines to some extent the content of the story.

I was looking for a format without such

I wanted something more interactive.

I know the word "interactive" has become obsolete as Internet marketers have started to use it.

Now I really miss the old telephone sales.

(Laughter) Yes, at least it's possible.

Actually, I used to hang up

But in the life consultation "Dear Abbey"

It said I was being rude, so the next time I called, I listened to half of his fluent pitches, and I said, "You're sexy."

(laughs) He cut it!

(Laughter) But in an interactive world, just as the audience can expand the possibilities of the performer's actions, the performer can shape the world that the audience experiences.

that's what i'm looking for

I started to analyze what I was doing, and I read "The Trickster Genealogy" by Lewis Hyde.

It was like being psychoanalyzed.

So he wrote it all down there.

And as I came to this conference, I realized that everyone here shared the same quality, because Tricksters are agents of change.

Trickster is an agent of change

The qualities I'm going to describe are the qualities that create the potential for change to occur.

Boundary crossing is one of them.

This is what infuriated the scientists.

But I like to cross boundaries

Like I said, I like to talk about things I don't know.

(phone ringing) I hope it's my agent, but I'm not getting paid.

(Laughter) I think it's good to talk about things you don't know, because it brings new perspectives.

I can see contradictions, contradictions that others cannot see.

For example, once in a pantomime, he called himself a meme.

What a selfish meme

They told me to show him more respect, because it took him 18 years before he could do a proper pantomime.

I said, "That's why only idiots do it."

(Laughter) It only takes two years to speak.

(Laughter) (Applause) This is what we call objectivity.

When you're surrounded only by people who speak the same language as you, or who share the same assumptions, you start to think that's all that's real.

For example, an economist's definition of rationality is that people are motivated by economic self-interest.

But look at Michael Howley or Dean Kamen or my grandmother.

My grandmother has always lived for others, wanted or not.

(Laughter) If I had played the Olympics in Passion, my grandmother would have lost on purpose.

(laughs) "No, no, you take the prize.

You're young and I'm old, no one will look at the awards

I can't go anywhere, I'm going to die soon anyway."

(Laughter) That's what it is. This border crossing, this intermediary, Fritz Lanting, is his name, and he actually said he was the intermediary.

That's the trickster's real quality

The other is a non-competitive strategy.

instead of contradicting

Instead of denying other people's realities, they create paradoxes, allowing multiple realities to coexist.

I don't know what it's called

As an example, here's a sign I found at a jewelry store.

"If you can wait, I'll get your ears pierced in the meantime."

(Laughter) When you say that, I imagine other meanings that surprise me.

(Laughs) "Oh no, that's fine.

I have some shopping to do, so I'll leave my ears here without waiting.

picture? picture? What was that? I can't hear you."

(Laughter) And another trait of tricksters is clever luck.

Coincidence in the sense that Louis Kahn (the architect) put it, this is another trickster quality.

Trickster is ready for the unprepared

I would especially like to say to scientists that tricksters have the ability to not get stuck in their own minds, they can incorporate new ideas, they can find contradictions and hidden problems in ideas.

I have no jokes in this story

I wanted to keep the scientists where they should be.

(Laughter) And that's why I want to create change, in creating relevance.

I find this connection more often than I find contradictions.

What did you call those gecko legs?

It's a gecko's foot, and it bends and stretches like Michael Motion's fingers.

i love relevance

One of the two matter factors in Newton's world is that there are two matter factors in Newton's world -- one is space occupation, and matter occupies space.

Perhaps the more important they are, the more space they occupy, which explains the phenomenon of SUVs.

(Laughter) The other is impenetrability.

In ancient Rome, impenetrability was the standard of masculinity.

Masculinity lies in how active a penetrator you are.

There are active producers and passive consumers in the economy, which is also why businesses must constantly penetrate new markets.

It's the same with forcing China to open its markets.

would have felt good

(Laughter) Now we're penetrated too.

Biotech companies are infiltrating us and putting tiny marks on our genes.

we are penetrated

I can't help but think that someone who actively hates us does that.

(Laughter) That's the second of four.

Of course you knew

there is still a long way to go

(Laughter) I want to short-circuit people's thinking when I make these connections.

I want it to stop tracing the normal connections and rewire them.

Recognition shock is literally re-cognition and rewiring of your mindset.

I'm sorry, it's like that woman in that joke. Do you know the joke about the woman who was driving with her mother?

mother is old

cross the red light

my daughter doesn't want to say anything

I don't wanna say "You're too old to drive"

Mom runs through the second red light

The daughter tries to be as tactful as she can, and says, "Mom, do you know you've already crossed two red lights?"

Mom said, "Well, I was driving."

(Laughter) And this is the shock of recognition, the shock of recognition.

And this is the end of chapter 4

(Laughter) I would like to say two more things.

Another feature of the Trickster is that the Trickster has to navigate this nuance.

balance is needed

The most important thing in creating my performance was to be fully prepared and under-prepared.

Finding that balance is always difficult because it can leave you unprepared.

But too much preparation leaves no room for chance.

I was thinking about what Moshe Safdie, the architect, said about functional beauty, because Hyde says in his book that tricksters sometimes slip into the world of beauty.

But to do that, you have to lose all your other qualities.When you enter the world of beauty, you end up with something complete.

Because you enter that world that occupies space and exists in time.

become an entity

Seeing the world of beauty is always special

But instead, if you can keep making coincidences happen, it's possible that you'll be on the same wavelength.

I like to think that what I'm doing is a wave of probability.

When you enter the world of beauty, the waves of probability converge to just one possibility.

I like to explore all the possibilities, and I want to be on the same wavelength as the audience.

The last trickster quality I'd like to mention is that you don't own a home.

always on the road

And in closing, I'd like to say to Richard, you built a house at TED.

Thank you for inviting me to your house.

thank you very much

(applause)

i am an architect

This picture is of my hometown, Beijing, China.

Beijing in the past was like a very beautiful garden, rich in nature.

When I was a kid, I learned to swim in this lake and climbed mountains every day after school.

But as the years went by, more and more modern buildings were built.

we all look alike

looks like a matchbox

Why are modern buildings and cities full of boxes?

The two cities in this photo are

On the left is New York, and on the right is Tianjin, a city in China that is currently under construction.

It looks very similar

probably following the same principle

It's about density, more space, more efficiency.

So modern architecture has become a symbol of wealth and power.

China has a lot of urban construction, and not only are they competing in terms of size and height, but they're learning a lot from American urban strategy, and it's being repeated in every city.

We say a thousand cities with the same face

I ask myself what I can do as an architect in China.

One day, I was walking down the street and saw a fish vendor.

I put the fish in a box-shaped tank

So the same question arose: "Why put the fish in the box?"

"Do fish like square spaces?"

(Laughter) Of course not.

It's probably because square spaces, box-like structures are cheap and easy to build.

So I did a little research, where I set up a camera and watched the movement of the fish in a square tank.

And what I learned is that fish aren't happy, that square housing isn't ideal for fish.

So I designed a new tank for fish.

Make the inside more organic and flowing

I thought it should be complicated

The fish that live here must be happy. Fish can't speak, so I don't really know.

(Laughter) But a year later, I got the chance to design these buildings for humans.

It's a pair of towers in the city of Mississauga near Toronto.

It's called the "Marilyn Monroe Tower" (Laughter) because of its curves.

The idea when designing it was that it's a residential high-rise, but it's not boxy.

It's inspired by nature, the movement of the sun and the wind.

After the design for the first tower was completed, they said, "You don't have to design the second one. You can use the same design. We'll pay you for two."

But I said, "There's only one Marilyn Monroe."

And since nature doesn't repeat itself, I made it feel like the two are dancing together.

i've always wondered

I wonder why modern cities tend to think of architecture as something like a machine or a box.

This painting shows how humans used to view nature.

When you look at this traditional Chinese painting, you'll notice that nature and man-made objects often mix in dramatic ways to create an emotional landscape.

The question that emerges in the context of modern cities is, can we not separate architecture and nature, but fuse them together?

This is a case of China.

in a very large apartment complex

It's a place with very beautiful nature

To be honest, when I first came here, I thought it was too beautiful.

So I decided to turn it down. It feels like a crime to mess with a place like this.

I don't want to be a criminal

But I changed my mind, if I didn't do it, someone would build a "normal urban" tower.

I hate that

so i decided to give it a try

What I did was I took the contour lines of a real mountain and turned those lines into buildings.

So the shape of this building comes from nature.

each made in different shapes and sizes and heights

It's an extension of the nature that's there.

Now, you might think that I'm going to use a computer to design this kind of architecture, but actually I tend to do it by hand, because I like the irregularities of hand drawing.

There's a kind of emotion in hand-drawn things that a computer can't.

Architecture, humans and nature can coexist and have good relationships like this picture.

This guy is actually one of the architects on our team.

I'm enjoying the beautiful natural scenery, and I'm relieved that I didn't become a criminal (Laughter).

Back to the city, in Beijing, I was asked to design a modern building.

made this

This architectural model is like a miniature mountain and valley.

I put it on my desk and watered it every day.

A few years later the building was completed

You can see how my hand-drawn sketches were transformed into real buildings.

very similar

like a black mountain

This picture shows this building in the middle of the city.

Located on the edge of a beautiful park

It's clearly different from the surrounding buildings. The other buildings are like building walls against nature.

What I wanted to try here was to make the building itself part of nature, and extend nature from the park to the city.

that's the idea

A Chinese art critic painted this picture

put our building in the picture

Can you see the little black mountain?

It matches well with this landscape painting.

But in reality, the problem is that this design differs from its surroundings.

They complained, they wanted me to change the color or the shape to match the mood around me.

And I wondered, why is this building so much better suited to old-fashioned nature than reality?

Maybe reality is funny

the current reality

He even built an opera house in the northernmost part of China.

It's right next to the river in the wetland park.

I decided to make this building a part of the surrounding landscape and blend in with the horizon.

Literally like a snowy mountain

Can climb buildings

During the day and when there are no performances, people come to enjoy the scenery and can stroll from the park to the top of the building.

When you come to the top of the building, there's an amphitheater that cuts through the sky, and you can sing to the sky.

Inside the opera house, there is a lobby filled with natural light, and you can enjoy the space where the inside and outside are mixed and the beautiful scenery around.

I've also created "mountains," and what I'm showing you now is a building that resembles a cloud.

This is the Lucas Museum of Art under construction in Los Angeles.

It's a museum created by George Lucas, the creator of Star Wars.

Why did you make it look like a cloud?

clouds feel mysterious

because it is nature itself

It's surreal to see clouds descending on a city, isn't it?

So people are curious and want to look around.

I made it with such an image

By floating this cloud museum above the ground, we can free up the landscape and space beneath the building.

And at the same time, you can create a garden on the roof and enjoy the scenery.

It's due to be completed in 2022. I invite you all.

After mountains and clouds, volcanoes are created in China.

It's a huge sports park with four stadiums inside, a soccer field that can hold 40,000 people.

it's a very big project

Looking at the pictures, you can barely tell which is the building and which is the terrain.

The building has become the terrain

It's a piece of terrain art that visitors to the park can walk around and climb.

This is a rendering of one of the park facilities.

A swimming pool capturing natural light from above

What we're trying to do is create an environment where the boundary between architecture and nature blurs.

Buildings are no longer mere machines for living functions.

reflect the nature around

It is also a reflection of our hearts.

As an architect, I don't think we should keep building inorganic, boxy buildings.

What I'm looking for is an opportunity to create a future where humans and nature are in harmony.

thank you

(applause)

There are two things I would like to talk to you about today. One is the emergence of a culture of availability, and the other is my request.

We are now witnessing this rise in availability, driven by the proliferation of mobile devices, globally and across all walks of life.

With this proliferation of mobile devices, we are also witnessing a phenomenon of people relying on being able to “connect” with others.

And then there is the third point, “duty” — the obligation that you must be “easy to connect”.

The question, which we are still struggling with, is, from a social point of view, how do we allow people to stay "connected"?

In fact, there is a significant difference between what we allow—

Apologies to Hans Rosling, he says anything that doesn't use real statistics is false. But the huge difference there is how we handle this issue from a public perspective.

Therefore, we have developed various tactics and strategies to hide and sneak.

The first of these is called "tilt".

If you're in a meeting and you've kind of lost your nerve there, you sit there, stare at someone, wait for them to look away, and quickly check your device.

You can see that the gentleman on the far right has spotted you.

"stretch".

Okay, the gentleman on the left says, "You bastard. I'm going to do a device check."

But his opponent, on this right side, he's stretching.

It's stretching your body, a physical twist to hide your device under the table.

Then there's my favorite guy. The one that says, "I love you, I really do."

(Laughter) Saying, "Please allow me to find someone else to care about," doesn't mean, "I love you."

And this one from India.

You can see this on YouTube, lying on a motorcycle and texting on a mobile phone.

It's what we call "Stop me before I kill someone, baby!"

It's probably this device that actually kills people.

What does this mean? . . (laughs) Head-on collision, I know. A head-on collision can be found between "ease of connection". And what is possible through “connectivity”—and a basic human need—which we hear all too often—is the desire to create shared narratives.

We are good at creating personal narratives, but it is the shared narratives that make up our culture.

And you're standing with someone and you're facing your mobile device. What you are actually saying to your companion then is, "You are less important than almost anything that reaches me through this device."

Look around.

There may be someone who is facing the device at this very moment. You are participating in a multidimensional relationship.

(Laughter) "Our current reality isn't as interesting as the story I'll tell you later."

this is my favorite one.

This poor fellow is clearly a stumbling block--I don't mean to hurt you, he's a stumbling block with pleasure--but the kisses that are being recorded now look like they're sucking or something.

This is the sound of one hand clapping.

So, as we lose the context of our identity, what becomes incredibly important is that what we share becomes the context of shared narrative, the context in which we live.

The stories we tell—the stories we transmit—are essentially who we are.

We don't just project our identities, our stories create our identities.

Well, that's my request to everyone in this room.

We are creating new technologies, which are creating new shared experiences, which are creating new worlds.

So my request is, please, let's create technology that makes people more human instead of inhuman.

thank you very much.

Winter is almost over and you wake up in a cold house wondering why you had the heater on all night.

trying to turn on

but it doesn't work

And the coffee maker, the TV, nothing works.

Life outside seems to have stopped

Schools are closed, most shops are closed, and trains aren't running.

This is not the opening scene of the zombie apocalypse movie.

What happened in March 1989 in Quebec, Canada, when the grid lost power.

Who is the culprit?

it's a solar storm

A solar storm is a giant cloud of particles that occasionally bursts out of the sun, reminding us that we live close to a working star.

As a solar physicist, I have a great opportunity to study these kinds of solar storms.

But "solar storm chaser" isn't just a cool title.

My research helps us understand the formation and behavior of solar storms, with the long-term goal of mitigating their impact on human society, which I'll talk about later.

It's only been 50 years since space exploration began, and the probes we've sent into space have shown that the planets in our solar system are constantly bombarded with particles emitted by the sun, which we call the solar wind.

In the same way that hurricanes affect wind patterns across the globe, sometimes solar winds are affected by solar storms, which I call "space hurricanes."

When solar storms reach planets, they can perturb the space environment and produce aurora borealis, which can be seen here on Earth, Saturn and Jupiter, for example.

Luckily here on Earth, we're protected by a natural shield, like a magnetic bubble, which we call the magnetosphere, and that's what you see on the right side of the slide.

On the other hand, solar storms can disrupt satellite communications and satellite operations, disrupt navigation systems like GPS, and power grids.

These are the technologies we rely on more and more.

Imagine if you woke up tomorrow and your cell phone doesn't work, you don't have access to the internet, and you don't have social media.

That's worse than a zombie apocalypse to me.

(Laughter) But by observing the sun all the time, we've learned how solar storms form.

This happens in the part of the sun that has a huge amount of stored energy.

Here's an example of a complex structure floating on the surface of the Sun, just about to erupt.

Unfortunately, the surface of the Sun is so hot that we can't send a probe to it, and the Sun's atmospheric temperature reaches 10 million Kelvin.

So I use computer simulations to analyze storms and predict their behavior immediately after they form on the surface of the Sun.

But this is only part of the story

As the solar storm travels through space, some of it inevitably runs into the space probes we've sent out to explore other worlds.

When I say otherworldly, I mean, for example, planets like Venus and Mercury, and celestial bodies like comets.

These spacecraft were built for other scientific research, but they can also act as small space observatories to monitor the evolution of solar storms.

So my research group and I will analyze this data coming from different parts of the solar system.

As a result, my research has shown that the shape of a solar storm is featureless and changes with distance from the sun.

Actually this is

It's the key to building tools to predict space weather.

Finally, let's say goodbye with this beautiful image.

This is the planet we live on, this pale blue dot

I study the sun and solar storms every day, and I will continue to love this beautiful planet with all my heart.

thank you

(applause)

How can an entire country run without oil?

That question came to me in the early afternoon in Davos four years ago.

I've been thinking about it ever since

And I started playing with it like solving a puzzle

At first, I thought, "It must be ethanol."

So I researched ethanol and came to the conclusion that people in every country need an Amazon in their backyards.

After six months, I was convinced that it must be hydrogen, but unfortunately, according to one scientist, if you use hydrogen, you're actually using up more clean electrons than you're putting into your car.

they weren't the way to go

And then, through a maddening process of thinking, I came to the idea that if we could convert the entire country to electric vehicles, which would be as convenient and affordable as possible, we would have solved the problem.

I started thinking from the perspective that it had to be something that could be scaled up at once.

Instead of how we build cars, how do we scale them so that they reach 99 percent of the population?

The idea that came to my mind was that it should be on par with the cars that are currently on the market.

First, it must be more convenient than a car

And second, it has to be even more affordable than today's cars.

Affordability is not a $40,000 sedan

You can't raise that kind of money right now, you can't buy it, can you?

Convenience doesn't mean 8 hours charging for 1 hour driving

We are bound by the laws of physics and the laws of economics.

So I started thinking about how to do this within the limits of our current scientific knowledge, without the extra time spent waiting for science fairs and magic batteries.

How do we make it happen in today's economy?

not the force of law

How can we make this idea a reality with the power of the consumer?

The afternoon of a casual visit to Tesla, I was able to find the answer by actually decoupling ownership of the car from ownership of the battery.

If you think about it, this is like the well-known "battery not included"

If you separate the two from each other, in order to meet the demands of a convenient car, it's necessary to build the battery supply network before the car.

There are two elements in this network

The first factor is charging your car wherever you park.A car is, after all, a strange beast that runs for about two hours and parks for 22 hours.

If you drive your car in the morning, drive it in the afternoon, and come back, the ratio of charging to driving is roughly one minute to one minute.

So the first idea that came to mind was that you could park anywhere and get power.

It may sound absurd at first, but some places in the world, like Scandinavia, are already well-equipped.

If you park your car without plugging in the heater, and when you come back, you won't be able to use your car.

That last mile, in a way, the last step is the first step in infrastructure.

The second phase of infrastructure that we have to work on is extending the distance traveled.

If you want a reasonable space and weight limit, you're constrained by current technology for batteries with a range of 120 miles.

120 miles is enough travel distance for many people

Stuck cars must be avoided

So the second element we added to the network was a battery exchange system.

drive and remove the dead battery

Put in a charged battery and get back to driving.

Machines do this work, not people.

It's like a car wash.

The plate pops up, grabs the battery, removes it, puts it back in, and within two minutes you're back on the road and back on the road.

If charging stations were everywhere, and battery exchange stations were everywhere, how often would you use them? You'll end up changing batteries less often than stopping at a gas station.

As a matter of fact, we added a clause to the contract.

If you replace the battery more than 50 times in a year, we will pay that person because it is inconvenient.

Then we discussed affordable and affordable prices.

We analyzed the problem in terms of what happens when the battery is removed from the car.

How much will the battery cost?

People tell us that batteries are very expensive

We found something very interesting happens when we shift the perspective from molecules to electrons.

We can go back and rethink the car economy in its early days.

A battery isn't a gas tank in a way

Your car has a gas tank, right?

there is crude oil

There's the refining and distribution of that crude oil, and we call it gasoline.

Batteries, in that sense, are crude oil

Battery bays, like gas tanks, can cost hundreds of dollars.

But crude oil will be replaced by batteries

It doesn't burn itself, it's slowly depleted.

These days, 2000 life cycles are possible.

It's like a little oil field

In the past, when we bought an electric car, we were asked to prepay for the oil field for the life of the car.

No one wants to buy a small oilfield when they buy a car.

So we kind of developed a new consumable.

You're buying miles for gasoline now

We made miles of electricity instead

And the price per mile of electricity ended up being a very interesting number.

In 2010, by the time we hit the market, it's eight cents a mile.

In other words, for those who are not good at math, in the average American consumer society,

20 miles (about 30 kilometers) per gallon (about 4 liters), per gallon

50-60 cents on the dollar, cheaper than gasoline today, even in the US

Even in Europe where taxation occurs, it is equivalent to -$60 per barrel (approximately 160 liters).

Plus, emile obeys Moore's Law

What started at 8 cents in 2010 will be 1 mile and 4 cents in 2015 and 1 mile and 2 cents in 2020.

I wonder why? Because the life cycle of the battery improves, because the small increase in energy density drives down the price.

And these prices are really the prices for clean electrons

We do not use coal-derived electrons

That's a kind of completely carbon-free, fossil-free e-mile that will be 2 cents by 2020.

If by 2020 we achieved our goal of 1 gallon, 40 miles

Imagine if there were only cars on the road that could go 40 miles on a gallon

80 cents a gallon

80 cents a gallon means that even if all the Pacific were replaced with crude oil, no matter what oil company you let them extract and refine, they wouldn't be able to compete with 2 cents a mile.

There's a new economic factor that will attract a lot of people.

This kind of thinking would have made for a great report.

In this way, I solved the problem in my head and distributed the report to the governments of each country.

Some governments have told me it's great that the younger generation actually thinks about things like this.

(Laughter) And then I met a true young global leader, the president of Israel, Shimon Peres, and he gave me an amazing opportunity.

First, he let me meet with the prime minister of the country, and he said, "If you can raise $200 million to build this network and find a car company that will build the two million electric cars that Israel needs, let's invest $200 million in the country."

Mr. Pels seemed to think it was a very good idea.

So we researched all car companies

I wrote a letter to all of them

Three of them never showed up. One said they would give us a discount if we put up with hybrid cars

Renault-Nissan's Carlos Ghosn had a very interesting thing to say when asked about hybrid cars.

He said hybrid cars are like mermaids

When you want a fish you get a woman When you want a woman you get a fish

(Laughter) And Mr. Ghosn said, "Mr. Perez, I'm going to build a car."

And indeed, as usual, Renault spent $1.5 billion to build nine different cars that fit this model, to be launched in high volume -- a total of 100,000 vehicles in the first year.

This is the first time that such a large number of electric vehicles have been introduced to the market as emission-free electric vehicles.

As Chris said, I was going to be the CEO of a giant software company called SAP, and Perez said, "You're going to lead this project, aren't you?"

I said, "You're going to be the CEO of SAP."

So I quit SAP and started Better Place

We then decided to expand the scale of our business

I visited other countries As I said before, I visited Denmark

Denmark has a very nice policy of IQ testing.

It is inversely proportional to tax

Over there, they put a tax of 180 percent on gasoline cars and no tax on cars with zero emissions.

Buying a petrol car in Denmark costs €60,000

If you buy our car, it will cost about 20,000 euros.

If you do not pass this IQ test, you will be asked to leave the country.

(Laughter) We were called something like a company that only served small islands.

Many people don't think of Israel as a small island, but Israel is an island, isolated in terms of transportation.

If your car is driving outside Israel, it has been stolen.

(Laughter) In terms of islands, we decided to visit the largest island we could find, Australia, and the third country we announced was Australia.

Over there, there are three hubs, Brisbane, Melbourne and Sydney, connected by a single motorway for electric vehicles.

The next island was easily found, Hawaii.

we decided to visit america

I've picked two of the best locations, one where you don't need to increase your travel distance.

In Hawaii, you can circumnavigate the island with a single battery.

If you drive for a long time, you can change the battery and continue driving around the island.

The second is the San Francisco Bay Area, where Gavin Newsom made some of the greatest policies of all mayors.

He decided to rule the state, first illegally, then legally, and he made some really great policies.

The San Francisco Bay area not only has the highest concentration of Prius, but also the perfect way to extend the distance.

It's called "Other Cars"

When we started to scale, I thought about what the problem was in America.

And I thought, why is that a big deal?

The most interesting thing we've learned is when small problems stand alone, like the price of gas when you drive your car each morning.

You don't usually notice it, but when you accumulate it, you can't get your hands on it, right?

Oil prices, like many of the curves we've seen, are on a downward curve.

Looking at the base of this curve, we are continuously losing oil wells close to the ground.

And it continues to acquire oil wells far from the ground.

It's getting more and more expensive to dig for oil

You may be thinking, "It's been going up, going down, going up again, and it's going to keep going up and down."

Here's the thing: Six months ago, at $147 a barrel, the U.S. government spent a lot of money to get oil.

And then the economy collapsed, and the price went back to $47 a barrel, it could be $40, it could be $50.

The government is now implementing emergency economic measures

It's called the $1 trillion emergency economic package

The American economy will recover, hopefully between now and 2015.

So what happens when the economy recovers?

At the current pace, there will be at least 2.5 billion new cars by 2015.

This is a 30 percent increase in demand for crude oil

This means an increase in consumption of 250 million barrels per day.

It will be the same amount as the current consumption in the United States

In other words, when the economy rebounds at some point, oil prices will continue to peak.

OPEC's emergency economic measures, also known as "1 barrel 200 dollars" measures will be implemented

scatter our money

Do you know what will happen then?

Crude oil prices go down, go up and go down

And the down period will be longer and the up period will be shorter.

That's the difference, like carbon dioxide, between the additive problem, which gradually rises to the top, and the depleting problem, which swings like a pendulum and falls until it loses everything.

We wondered what the answer to this question would be

Remember the campaign "1 million hybrid cars by 2015"

That's just 0.5 percent of America's crude oil consumption

Equivalent to 0.0% of oil fields if other countries are included

I don't expect this to make much of a difference

An MIT study says 10 million electric cars will hit the roads around the world.

In the future, we will add 10 million units out of 500 million units

This is the most pessimistic number imaginable

It's also the most optimistic number, because we're going to scale this industry to 100,000 units in 2011, 10 million units by 2016, so we're going to have 100 times more units in less than five years.

It must be remembered that the world now produces so many cars

Every 10 million units are produced by region

this is a staggering number of cars

China produces cars in addition to them, as do India, Russia and Brazil

All over the region, cars continue to be produced.

Europe has solved this problem by imposing a tax on gasoline.

They will be the first to get out of this situation because their gas prices are high.

China will settle by decree, at some point they'll end up declaring that they won't accept petrol cars all over town.

India doesn't know what we think is the problem in the first place, because people in India fill up two or three gallons every time.

For them, getting a battery that can run 120 miles is an extension of their journey, not a reduction.

We are the only ones who can't even set the oil price properly.

industry is not functioning properly

We lack the incentive to try to solve this problem in America.

What is the position of the automobile industry?

It's very interesting to see that the auto industry is only focused on itself.

When they saw this problem, they said, "Car 1.0 will solve everything on its own."

sees no infrastructure as a problem

We forget the chains that exist around us

these are interrelated

We think Car 2.0 is coming, it's a new market, it's a new business model.

It's a business model where you actually get paid to drive a car. It means that the driving time and the mileage that you're familiar with will be included in the price of the car.

Some of that goes to car manufacturers

some will go back to my pocket

Our cars are actually cheaper than gasoline cars.

Imagine a world where cars match windmills

In Denmark, all cars are powered by windmills, not gasoline.

Israel requested the installation of solar farms in the southern part of Israel.

People said to me, 'You're asking for a large site.'

I asked, "What would you do if you could prove that there is enough crude oil for the country for 100 years in the same place?"

I was told, "I searched, but there is no crude oil."

When asked, "What would you do if you could prove it?"

He said, "Then go dig," so I decided to dig up instead of down.

These are business models that are fully intertwined with each other.

Requires only 10 percent power generation

Think of this as a ten-year project

That's 1 percent a year

When we think about solving big problems, we have to think in terms of two numbers.

And they don't mean 20 percent by 2020

The two numbers are zero, zero oil, and infinite expansion.

And as we attend COP15 later this year, I can't stop thinking about inflating carbon dioxide.

We have to think about pushing countries to implement this scale.

Emit 4 tons of exhaust gas per vehicle

And the 700 million cars that exist today emit 2.8 billion tons of carbon dioxide.

That's 25 percent of the problem today

Cars and trucks together account for 25 percent of the world's carbon footprint

We need to focus on this issue and actually start working to get our emissions to zero before the world ends.

I have shared this with members of Congress in the United States

I shared it with a gentleman named Bobby Kennety Jr., one of my admirers.

I told him that one of the reasons his uncle will be remembered by the people is that he will send a man to the moon by the end of the decade.

Never send people to the moon with a probability of 20%

I didn't say 20 percent chance of recovery.

(Laughter) He told me another story that happened 200 years ago.

200 years ago, there was a very long debate in the British parliament about economics versus ethics.

As much as 25% of the current 25% of emissions come from cars, 25% of the energy in the UK's total industrial world is

It came from an immoral energy, a slave.

And the debate arose: should slavery be abolished?

What is the economic impact?

And people say, 'We need time to put it into action.

Don't do it right away, let's just free the children and leave the slaves alone."

After a month of debate, the decision was made to abolish slavery, and within a year the Industrial Revolution began.

Britain got 100 years of economic growth

we must make good ethical judgments

we have to decide now

We need presidential leadership, like Israel, who has declared that it will stop using oil.

And it needs to happen during this presidential term, not in 20 or 50 years, because if we don't do it, we'll lose our morals along with our economy.

thank you very much everyone

(applause)

it was in 1776

In Bavaria, new ideals of rationalism, religious liberty, and even universal human rights collided with the enormous influence of the Catholic Church on public affairs.

Across the Atlantic, a new nation took this new idea as its basis and claimed its right to independence.

But in Bavaria, law professor Adam Weishaupt's attempts to teach secular philosophy were not working.

Weishaupt decided to spread his ideas through secret societies and expose the shortcomings of the church's ideology.

he named the secret society the illuminati

Weishaupt used Freemasonry as a model for his secret societies.

Originally a guild of the best stonemasons of the late Middle Ages, Freemasonry changed from teaching the art of stonemasonry to promoting the ideals of knowledge and reason more generally.

Over time, it evolved into a semi-clandestine, exclusive order, with many of the wealthiest and most influential people in it, and elaborate secret initiation ceremonies.

While still in Freemasonry, Weishaupt created his own organization and recruited members from among the high-ranking Freemasons.

He code-named him Spartacus, after the leader of the Roman slave rebellion.

Early members formed a committee called the Areopagus that oversaw the Illuminati.

One of these members, Adolf Knigge, a Freemason, became an influential recruiter.

With Knigge's help, the Illuminati grew in membership, became influential in several Masonic congregations, and adopted Masonic rituals.

By 1784, it had over 600 members, some of them famous scholars and politicians.

As the membership of the Illuminati grew, so did the momentum of the American Revolution.

Thomas Jefferson later named Weishaupt as an influence.

European monarchs and clerics feared similar revolts in their lands.

Meanwhile, the existence of the Illuminati became an open secret.

Both the Illuminati and Freemasonry were exclusive groups of wealthy elites in society, which meant that they were in constant contact with religious and political affiliations.

Many in government and church believed that both groups were trying to undermine people's faith.

But these groups weren't necessarily against religion, they just believed that church and state should be separated.

Still, the skeptical Bavarian government began keeping records of people rumored to be members of the Illuminati.

By decree issued by Karl Theodor of Bavaria in 1784, just as members of the Illuminati began gaining important positions in local government and universities.

All secret societies were banned. It seems difficult to officially ban something that is ostensibly secret, but this time it worked.

Only nine years after its formation, the society was dissolved, its records seized, and Weishaupt exiled.

When the Illuminati disappeared, its notoriety grew worse than it had during its brief existence.

A decade after the French Revolution, conservative writers argued that the Illuminati escaped expulsion and plotted to overthrow the monarchy.

In the United States, pastor Jedidiah Morse promoted the theory that the Illuminati were plotting to overthrow the federal government as well.

But even with the idea that secret societies are still orchestrating coup, there is no evidence that the Illuminati survived, revived, or went underground.

The existence of the short-lived society is well documented in the Bavarian government records and the still active Freemasonry records, especially in the overlapping parts, and has never been recorded since.

In the spirit of Illuminati rationalism, I can't help but think it no longer exists.

But the ideas that drove Weishaupt to create the Illuminati still spread and became the foundation of modern Western nations.

These ideas did not begin or end with the Illuminati, but the Illuminati community represented a wave of change that was already underway at its founding and that continued long after its dissolution.

I've studied technology and magic

magician is a funny thing

We can show you magic that technology can't.

But what if today's technology seems almost magical?

If I could do this-

(Music) A hundred years ago this would have been the magic of levitation.

Can we create the illusion of a world where technology makes anything possible?

Jump!

If you knew the seeds, where would the wonder be?

Yet humans are more imaginative than logical, and we see character in machines very quickly.

this is a quadcopter

there's more than flying machines

It analyzes its environment and reacts to what I do.

When algorithms allow us to fly autonomously in close formation, to recognize each other and myself, mathematical logic is mistaken for intelligence, and intelligence for personality.

It's anthropomorphism, it's illusion, created by technology and colored by the imagination.

(Music from "Close Encounters of the Third Kind") (Quadcopter lights up with a five-note motif) Saying hello

Come on down

it's time to land

it's over

thank you

(Applause) It's time to go home

everyone come in

Come on, quickly, quickly

Don't push me, there's a proper place

Hey, just a little more to the left, just a little more to the right

all entered entered well done

(cheers) Thank you

(Applause) Thank you.

(applause)

The future of life What does biology tell us and where does it lead us?

No slides, turn up the lights I'm just talking

I listened to previous sessions.

I was a little reluctant to talk about lifting the future.

i felt wrong

But even so, when you think about it, it's this grand trail that really remains when future generations remember this era.

I want to talk a little bit about how tragic the future that Jeremy Rifkin wants to get rid of biotechnology, or Bill Joy, who wants to throw it away, is.

I'm going to focus on biology and bioscience.

because these are the areas that affect us the most.

The reason is clear

because we are made of flesh and blood

because we are creatures

And what biology brings to the table will shape our future, and that of our descendants, by controlling aging, by preventing Alzheimer's disease, by defeating heart disease and cancer.

I think Shakespeare did a really good job of expressing it.

The order of words remains the same

(Laughter) "That's how people continue to mature.

continue to rot at the same time

There is a little reason for this."

life is short

we have to make a little plan

Even in a world as advanced as this, we will eventually lose everything we love.

When it starts to rot a little, you don't care about all the images you've stuffed in your head and all the privileges that power is based on.

I'm growing gray hair, Ray Kurzweil, Eric Drexler.

This is where we care most

I know there's been a lot of hype about the dynamics that control biology.

If you look at the human genome project, you'll see

It was only two years ago that people were raving about finding the holy grail of biology.

we're deciphering the code

that you are reading the book of life

It reminds me of Neil Armstrong's walk on the moon in 1969, when everyone was on their way to space.

Have you seen 2001: A Space Odyssey?

It's 2003 and Hull doesn't exist.

I can't even go to the moon of Jupiter, let alone the moon of the earth.

We're still retrieving pieces of the Challenger that disintegrated in mid-air.

It's no wonder people think that 30 years from now, 40 years from now, when you look back at this era and how much the topics of the time, like the Human Genome Project, mean so much, it's so trivial.

I want to say that it will never happen

The topic of altering, transforming, and regulating our genes and biology is about modifying ourselves.

very important topic

If you have any doubts about the impact of technology on our lives, just look at the world's major cities.

It's not the territory of our Pleistocene ancestors.

What we're doing is turning our backs on technology that is more precise and effective.

But before we do that, just as we have changed the world around us, we will change ourselves.

It will happen sooner than people imagine

And in the process, I'm sure there will be a revolution in medicine and healthcare.

The birth of a new life will also change

It also changes the way we suppress and transform our emotions.

life expectancy will likely change

It will seriously question what it means to be human.

There are currently two unprecedented revolutions related to this.

One is obvious, the silicon revolution, and you're probably familiar enough with it.

It has changed our lives in many ways and will continue to do so.

What's important here is that we're picking up the sand beneath our feet, the unremarkable silicon, and imbuing it with a complexity that rivals or exceeds that of life.

And that revolution will inevitably lead to a revolution in biology.

From the genomics revolution to proteomics to metabolomics, "Mix" is a word for research grants and business proposals.

What I'm doing is trying to control the evolutionary future.

So we're trying to use technology to fast-forward evolution.

It is still unclear what the outcome will be.

But in five to ten years, you'll start to see significant changes.

We're going to see changes in medicine in the near future.

As we can identify individual risk factors, we will see a major shift in the development of preventative medicines.

But who will pay?

How do you make sense of complex information?

This exchange of information is the next-generation IT challenge.

There's a field called pharmacogenomics that deals with pharmacology and genetics, and that field that Fan mentioned earlier is tailoring drugs to individuals.

will have a tremendous impact

It will also be used for dietary therapy and supplements.

But the bigger impact is getting niche drugs.

The budgets we're building today to create breakthrough new medicines won't be enough.

In fact the authorization process would collapse

too late

too much risk aversion

Not suitable for the future we are heading towards

The other is that we need to face this knowledge.

For example, there's this wonderful statement: "99.9% of the genetic code matches.

We are together Isn't this amazing?"

On the other hand, if you look around you, it's the subtle differences that really matter to us.

To an alien, we might look the same, but to each other we look different because we're always competing.

We have to accept the fact that we're going to discover individual differences, and differences between different species of humans.

Denying it doesn't get you off to a good start

In a generation or so, there will be even more profound changes.

It's about using knowledge to start altering ourselves.

It's not about growing gills, aging is more about us.

What if we could understand and understand aging? What if we could slow or reverse the aging process?

everything will change radically

It's obvious to everyone, if we can do it, we'll definitely do it, no matter what the outcome.

The second is about changing emotions.

Ritalin or Viagra Prozac

This is like child's play

What if you could take a small amount of the concoction and get the satisfaction of just being yourself?

Can you resist temptation if there are no overt side effects?

you probably won't win

Who are you if you can't win?

why do i do what i do

It's like avoiding an evolutionary program that guides our behavior.

it will be very difficult to deal with

The third is reproduction.

As we learn more about genes, we have ideas about choosing genes for children.

In my book, "Humans Still Alter Humans," I talk about the choices we make and the problems they present to society.

There are three ways to reproduce.

one is a clone

did not come true

just the media made a fuss

It will come true in five to ten years.

it won't be big news anymore

Staggered identical twins are unlikely to shock Western civilization.

And there's something that's already happening, and it's more important, embryo screening.

They take about six to eight embryonic cells, put one through genetic testing, and depending on the results, either transfer or discard the embryo.

Already in place to prevent rare diseases

In the near future, this method will prevent virtually all genetic diseases.

And as that happens, everyone will have access to technology that used to be reserved for those with fertility problems, those with IVF, those who wanted to protect their children, and the wealthy.

Along the way, technology will not only be used to treat illnesses, but also to lesser problems, such as manic depression and aggressive personalities, temperaments and traits.

Genetic engineering is of course also used

It won't be long before we'll be able to probe and regulate genes in lung cells.

The way I envision it is adding artificial chromosomes. We have 46 chromosomes, and we're going to make it 47, 48.

And it's not inherited. You wouldn't want your kids to inherit an old, enhanced version of 25-year-old technology that their parents used.

it's a joke

everyone wants the latest release

We see it in computers and programs (Laughter), and this relationship is actually much more serious.

really become a reality

But you should do whatever you can

or not

But if in thousands of labs around the world the technology I mentioned earlier becomes feasible, and as many people already believe are useful, and difficult to restrict, then the question is no longer whether to use it, but when, where, and how.

Humanity will continue down this road

There are two reasons

First, all of these technologies stem from mainstream medical research, which everyone wants.

a lot of money is invested

Second, because we are human.

It's human to do this

We experiment with technology, we use it, we try to improve our lives in some way.

Not using what has been made available is tantamount to ignoring human self-denial and the benefits and problems of technology.

The lines blur, and what's already becoming is between therapy and empowerment, between cure and prevention, between need and desire.

I think the last one in particular is the core of the problem.

people are blind to technology

I can deny it, and I've actually done so.

But in the end, doing so simply encourages development in other fields.

I just turned a blind eye

It's going to keep technology occupied by the wealthy, because they're good at finding loopholes.

And they may not have the information they need to make decisions about how to use technology.

so we need to discuss

Also great to discuss

But we shouldn't take it lightly when we reach consensus.

never reach

technology is too close

It's also strongly influenced by history, philosophy, religion, culture and politics, and strongly influenced by history, philosophy, religion, culture and politics.

There are people who despise this kind of thing as the worst, the worst thing.

on the one hand wonderful

Some people will be pleased that it is the result of human efforts.

One thing that's very dangerous about this kind of technology is that it's tempting.

Don't just focus on the possibilities that advanced technology will bring.

Don't forget normal human nature and your own health.

Too many people think that high-tech medicine will cure problems like overeating, eating too much fast food, and not exercising enough.

it's not like that

It's very interesting that in the midst of so many amazing technologies, there's some sort of counter-revolution going on. In the field of functional foods, old cures are being brought back into the spotlight, especially by those in the pharmaceutical industry, who have declared this move unscientific.

But in all of these outcomes, IT plays a role.

We get a lot out of our rich biota.

half of the medicine comes from

Don't ignore it, because now is the perfect time to take advantage of the many things that have impacted our health for the last millennium.

Use advanced technology to weed out the useful from a sea of ​​miscellaneous information.

not just an abstraction

I started a biotechnology company, using IT to organize old information and develop treatments for Alzheimer's disease and aging-related diseases, and we're seeing real results.

this is where we are now

It's the beginning of a new millennium

The people of the future, the humans of the future, will look back on this era long before the end of the millennium, hundreds of years from now.

When I put together all the lectures I have given so far today, people in the future may look back on today and think how difficult and painful times have been.

but i don't think so

Even if the times change, people do not change

Forget the painful things and beautify this time

Future generations will see it as a glorious era that laid the foundation for their lives, their societies and their future.

like the birth of life

All kinds of bloody things happen

What can you get out of it? New life

As pointed out before, the difficulty of reaching is forgotten.

It's clear to me that one of the cornerstones of the future is the restructuring of biology.

It will start slow and then speed up

will make a lot of mistakes

that's how it is

For me, it's an incredible privilege to be able to live in these times and see progress.

It's a special time in the history of all life.

will go down in history forever

What's amazing is that we don't just observe, we create.

should be proud

The hard and painful thing about this is that we are also the objects of change.

Our health, our lives, our future, our children's futures will change.

I think that's why so many people take a step back in fear.

In this life choice, our choice is not whether or not to take this path.

it's definitely going

how we do this

I wonder if I'll accept it

In 430 B.C., Thucydides said something nice.

I'm quoting him verbatim

"The brave are those who can see both the glory and the danger in front of them with equal clarity.

On top of that, I am the one who can stand up against them.”

thank you

(applause)

Alosphere, it's a metal sphere three stories high in the dereverberation chamber.

Think of the allosphere as a dynamically variable digital microscope that's connected to a big supercomputer.

Twenty researchers can stand on a bridge suspended inside a sphere and be completely inside their own data.

Imagine a group of physicists standing inside an atom watching and listening to electrons spin.

Imagine a group of sculptors going inside an atomic lattice and sculpting with their material.

Imagine a team of surgeons entering the world of the brain, feeling tissue as a landscape, and hearing blood density levels as music.

These are some of the studies that we're doing at Alosphere, which you're about to see.

But first, let me tell you a little bit about the team of artists, scientists and engineers involved in this.

I am the composer of the orchestra and the inventor of the Alosphere.

Together with our team of visual artists, we visually and acoustically map complex mathematical algorithms as they unfold in time and space.

Our team of scientists is finding new patterns in information.

Engineers are building the world's largest dynamically variable computer for this kind of data exploration.

So let me introduce you to five research projects in Allosphere, from macrobiological data to electron spins.

The first is Allobrain

The goal is to discover which parts of the brain interact while looking at beautiful things, and to quantify beauty.

What you're seeing is the cerebral cortex of my colleague's brain.

These movements are real FMRI data mapped visually and acoustically.

It's become a world where you can fly around and interact with your brain.

Can you see those 12 little rectangular computer agents flying together in your brain?

It's looking at blood density levels.

And it reports acoustically.

A higher density level means that that part of the brain is more active.

In fact, when the density is high, the agent sings at a high pitch and teaches us.

Next, I'll introduce biogenetic algorithms that move from real biological data and use artistic and scientific exhibits to create artificial nature.

It's an artistic and scientific exhibit that teaches us how the algorithm of microbial development drives self-generation and growth, which is very important for nanoscale science simulations.

As artists, we create new worlds to discover and explore.

This developmental algorithm grows and interacts and communicates over time like a swarm of insects.

Researchers are running the code of bacteria, a computer program that drives the growth of this organism, and interacts with the data.

Now let's jump out of the biological macro world into the atomic lattice and into the atomic world.

This is actual atomic force microscopy data from my colleague who works at SSLEC.

They found a new transparent solar cell material with a new atomic bond.

It's currently flying through a lattice of 2,000 atoms of oxygen, hydrogen, and zinc.

You can see the triangular atomic bonds.

4 blue zinc atoms and 1 white hydrogen atom are bonded together.

Can you see the electrons flowing along the streamlines that the artist made for the scientist?

Now you can find bond nodes in any atomic lattice.

Beautiful structural art, don't you think?

What you're hearing now is the sound of an actual atomic emission spectrum.

We mapped this to the vocal domain, which is why it sings to people.

Oxygen, hydrogen, and zinc all have their own sounds.

Now let's go one step smaller from here. Now let's get out of this atomic lattice and move on to the hydrogen atom.

I'm working with a group of physicists who have done the mathematical calculations for the three-dimensional time-dependent Schrödinger equation.

What you're seeing now is the overlap of electrons in the three electron orbitals at the bottom of the hydrogen atom.

You can actually see and hear the flow of electrons along the line.

The white dots are stochastic waves that indicate where the electrons are in these three orbits in time and space.

So now let's move on to two orbital configurations, and soon you'll hear a pulse.

And you hear a swell between the sounds

It's actually a luminary

Sound begins to pulse and contract, and this is how physicists know when a photon is emitted.

This calculation is about to discover a new mathematical structure.

We also have a better understanding of quantum mathematics.

Now let's go one step further down the hierarchy into the world of single electron spins.

This is the last project you will see today.

A colleague at the Center for Quantum Computing Spintronics measures the laser decoherence for one electron spin.

Based on that information, I built a mathematical model.

You can actually see and hear the flow of quantum information right now.

This is a very important next step in simulating quantum computers and IT.

Now, the simple example you've seen above is part of the work we're doing at the University of California, Santa Barbara, where we want to bring together art, science, and engineering to create a new era of math, science, and art.

By all means, everyone, please come and see the actual Alosphere.

And be inspired to do more with this unique device made in Santa Barbara.

Thank you very much

(applause)

Before the world of humans began, there was a world of gods with fields, plains and gardens.

Four brothers wandered this heavenly land

We had no other family than ourselves, and we didn't even know our parents.

One of the brothers, Deminan, looked different than the other brothers.

His skin was covered with painful scabs and he wondered why he was the only one with these scars of anguish.

One day, while Jaya, the highest-ranking divine spirit, was out in the garden, Deminan and her siblings broke into Jaya's house.

After feasting and exploring at home, I found a giant gourd hanging in the corner.

But when I tried to look inside the gourd, I dropped it.

The gourd broke and became a deluge, swept away my brothers and forever separated them from the earth of heaven.

The water that flowed from the gourd created a new world

That world is covered with an ocean that did not exist in the world of the gods.

The sea was teeming with fish and other creatures, dotted with islands and caves.

This world of the sea was completely cut off from the world of heaven, and the brothers wandered aimlessly, more lost than ever.

One day, three of my brothers happened to find a house.

The old man who lived in the house, Baiyomanacoa, invited them to his house.

After a while Deminin caught up and followed them into the house.

Baiyomanacoa announced that he was his grandfather and gave him a special loaf of cassava.

Baiyomanacoa told me about her family tree: her mother was the earth goddess Itibi Kahubaba, who died while giving birth to her children.

The brothers thanked me for their hospitality and for telling me about their past.

But Baiyomanakona turned to Deminan and spit cigarette-laden spit up his nose into his back.

The saliva-stained area immediately began to swell and tingle.

Before long Deminan was in a state of confusion and his back swelled so much that his brothers feared he might die.

Not knowing what to do, they cut open the wormy area.

The tortoise emerged from the wound and swam away, crossing the boundary between sea and land with great ease.

When Deminan awoke from his confusion, he finally understood the intent behind the curse of disease.

He was the one who connected the heavenly world and the human world.

Deminan was the first caracaracol to be handed down for generations.

When he dropped the gourd, the world of the sea he and his brothers created became the world of men, and the Caracaracols who succeeded Deminan maintained a delicate balance between humans and gods.

But that special ability came at a price. Deminan and all the Caracaracols who followed him continued to suffer from the disease that initially made Deminan so special.

The swollen backs and emaciated arms of Taino sculptures and figurines symbolize Cara Caracol's cursed yet blessed role as a bridge between two worlds.

this is my nephew yang yang

A cute and irresistible 5-year-old

I asked him the other day, "What do you want for your birthday this year?"

And he said, "I want a Spider-Man mask."

I had no idea what it was, so I said, "Wow, that's cool, but how do you get it?"

Without blinking, he said, "Ask your mom before you go to bed.

when mom shakes her phone

When I wake up the next morning, the delivery guy will give it to me."

I tried to tease him, but I quickly realized that he was just telling the truth, and that's how shopping was done for his age.

With that in mind, for a kid like Yang Yang, shopping is a very different concept than what my age envisions.

Shopping is always online, and all payments are virtual.

There's a huge shopping revolution going on in China right now.

The act of shopping and technology platforms have evolved differently than anywhere else in the world.

For example, e-commerce in China is taking off.

It's growing twice as fast as the US, and a big part of that growth comes from mobile spending.

Half a billion consumers shop on their mobile phones every month, which is as many as the populations of the United States, the United Kingdom and Germany combined.

But it's not just about the scale of e-commerce, it's about the speed of adoption and the convergence of the ecosystem.

It took less than five years for China to become a land of m-commerce, thanks largely to two technology platforms -- Alibaba and Tencent.

85% of social media, 85% of internet payments, almost monopoly with 2 companies holding 90% of the e-commerce market.

The two companies have also made considerable strides in the markets of digital content, video, online movies, literature, travel information and games.

There's a chemistry when this huge consumer base of mobile shoppers meets an integrated ecosystem.

Now China is like a giant laboratory doing all kinds of experiments.

By all means, please come to China, because you will be able to experience a little bit of the future here.

One of the trends I've seen is around the spontaneity of shopping.

Five years ago, when I was studying fashion, I realized that each Chinese consumer buys, on average, between five and eight pairs of shoes.

That number has tripled to about 25 pairs per year.

who needs that many shoes?

"Why are you shopping?" I asked.

They told me what inspired them to shop: blogs, celebrity news, fashion news, etc.

But really, for most people, there's no particular reason to buy.

He's just browsing the site on his phone and buying whatever he sees.

We've found that buying everything from groceries to insurance products feels the same, naturally.

But when you think about it, it's not that difficult.

The middle-class and upper-middle-class lifestyles are still very new for many Chinese consumers, and there is a strong desire for new products, services, and all kinds of new products.

And this integrated ecosystem makes it easy for consumers to shop one after the other with a single click.

But this new way of buying is creating a lot of problems for the once-dominant businesses.

The president of an apparel company said he was tired of customers complaining that his company's products were outdated.

It's pretty damning bad news for apparel companies.

Although he was already increasing the number of products presented in one collection,

doesn't seem to work

I told him there were more important things to do.

We have to provide the products that consumers really want while they want them.

There's something we can learn from China's leading online apparel companies.

The real consumer feedback these companies collect comes from mobile sites and social media, and the company's designers translate this information into product ideas, which are then sent to micro-contractors.

This small subcontractor is the real key to the whole ecosystem, because the order volume here is small, we only take 30 pieces at a time, and we can also make some customized products.

In fact, they're all manufactured and designed in the same region, and the whole process from shipping to getting the product to a physical store or online can take as little as three or four days.

It's a very fast process, and it's pretty responsive to what's trending in the market.

This is a pretty nasty situation for traditional retailers, because they only think about a few collections a year.

And then there's consumer demand for extra convenience.

A few months ago, I went shopping with a friend in Tokyo.

We were in the store, and there were three or four people in front of us waiting to pay.

It's a normal sight, isn't it?

But we both put back our picks and left.

we are so impatient

Exceptional convenience is not just a "nice to have"

It's essential to making sure customers buy.

And what we've found in China is that convenience is what makes online shopping entrenched, behavioral and habitual.

In some cases, preferential customer service alone is more effective.

Take Hema for example

This is a store based on the concept of retail groceries developed by Alibaba.

This store offers a basketful of products with a minimum of 4,000 SKUs (unit of inventory management) delivered to your home within 30 minutes.

Amazingly, they deliver everything, not just fruits and vegetables.

They even deliver fresh fish and live Alaskan King Crab.

A friend of mine once said, "It's really a dream come true.

Even if my mother-in-law suddenly comes to eat dinner, I can make a dish that will surprise her."

(Laughter) Companies like Amazon and FreshDirect are experimenting in the same area.

Thanks to Hema being part of the Alibaba ecosystem, delivery times are faster and implementation is a little easier.

When it comes to online groceries, it can be very difficult and expensive to ship a large number of items quickly, but Hema has a mobile app, mobile payments, and 20 brick-and-mortar stores in multiple Shanghai metropolitan areas.

We built these stores to ensure the freshness of our products — in fact, they even have fish tanks in them, and also to make sure there's a place to make quick deliveries.

I know you're wondering

Are you making money?

yes it is profitable

The bottom line is 50/50, and what's even more amazing is that each store's sales revenue is three to four times that of a traditional grocery store, and half of the orders are placed on mobile phones.

What this proves is that if you offer extra convenience that really works for grocery shopping, consumers will quickly switch to online shopping.

Exceptional convenience and spontaneity aren't everything

In China, we also see social shopping with friends.

If you think about social shopping in other countries, it's a linear process.

You discover something on Facebook, see it, go to Amazon or brand.com, and complete your shopping.

Effortless and simple

But in China, it's completely different.

Each consumer spends an average of one hour shopping on their mobile

That's three times as long as in America.

What causes this length of time?

What are they actually doing on this little screen?

So let me show you what it's like to shop on your phone, something that I experience all the time.

11:00 p.m. Yes, that's when I usually do my shopping.

I was chatting with my friends on WeChat

One of them pulls out a bag of snacks and puts a link to the product page in the chat room.

I hate it because I usually click on that link, but then it leads me to the product page.

It's a lot of information, it's very colorful, and it's absolutely mind-boggling.

I'm looking at it, and a few moments later, a store clerk pops up online and says, "Good evening, welcome."

Of course I bought snacks

Even better, the snacks were delivered to my office the next day around noon.

I'll eat it and share it with my co-workers, shipping for up to $1.

As soon as I was about to leave the shopping site, another screen popped up.

Now, an internet celebrity will be livestreaming to teach you how to apply your new lipstick.

I watched it for about 30 seconds, and it was pretty self-explanatory, and right next to it, there was a link to buy, and I clicked it, and within seconds, I bought it.

let's go back to the chat room

Flowers are still blooming in rumors

A different friend posted a QR code for another snack.

click to buy

So the whole experience is like exploring an amusement park.

Chaotic and fun, just a little addictive

This is what happens when you have an integrated ecosystem.

Shopping is firmly embedded in social media, and it's evolving into a multidimensional experience.

Ecosystem integration reaches a whole new level

Our influence in every aspect of our lives is also changing.

Of course, behind that lies a huge business opportunity.

Three Squirrels, a Chinese confectionery company, built a half-billion-dollar business in just three years, by adding 300 to 500 employees and offering 24/7 online customer service.

In the social media environment, they're like your next-door neighbor.

Even when he's not buying the product, he's happy to tell jokes and make me feel good.

Within this integrated ecosystem, social media can redefine the relationship between brands, retailers and consumers.

These are just a few of the huge changes I've seen in China.

Many experiments are going on day after day in this huge laboratory.

The ecosystem is reinventing everything from reinventing distribution networks to marketing products.

Consumers are becoming more decisive. They can decide what they want to buy, when and how they want to buy it, and how they use social media.

Now is the time for global business leaders to step back, wake up, face up to what is happening in China right now, and take action.

thank you

(Applause) Massimo: Angela So what you're telling us is absolutely shocking and mind-boggling, but I'm sure many of you in the audience have the same question as I do: is this kind of impulsive consumption sustainable in the long term, economically and environmentally?

How much would such an automated, super-convenient shopping experience cost?

Angela: Well, the thing to keep in mind is that we are on the verge of a huge transformation.

So given the consumer's desire to get better, and the evolution of the ecosystem, there are a lot of opportunities and challenges.

The early signs I've seen are that the ecosystem is shifting its focus to addressing these challenges.

For example, we're more focused on sustainability, but we're also concerned about speed, and we're more concerned about quality than quantity.

But there are no simple answers to these questions.

So exactly what I'm here to say to you is that we need to observe and learn from it and play our part in this evolution.

Massimo: Thank you very much

Angela: Thank you

(applause)

This photo is of 2 year old Tim Ferris in 1979

As you can see from this pose, he was a boy full of confidence.

Around this time, I had a pretty routine: I would come in the evenings when my parents, after a long day at work, would sit back and relax with their crosswords and TV.

I storm into the living room, jump on the sofa, rip the cushions off and throw them on the floor, let out a deep tummy roar, and go home I'm playing the Incredible Hulk.

(Laughter) As you can see, it's very similar.

This routine lasted for a while

When I was seven years old, I was sent to summer camp.

my parents wanted a peaceful moment

Every day at noon we all go to the pond There is a floating dock

jump into the water from there

Born prematurely, I am small

His left lung was collapsed when he was born.

Because it didn't float well on water

I used to be afraid of water

I still go sometimes

One day at the camp everyone was jumping into the float It's a dive to the inside of the float. because it looks interesting

I jumped in and one of the bullies grabbed me by the ankle.

I tried to get up and breathe, but the tube was on my back.

I struggled desperately and thought I was going to die

Luckily the leader came and separated us

From then on, I became afraid to swim.

I couldn't get over it

Not being able to swim was the biggest humiliation for me.

It made me realize I wasn't the Hulk.

This story has a happy ending

In August of this year, at the age of 31, I tried swimming again for two weeks.

At first, I was swimming like a drowning monkey for 20 yards in the pool, and my heart rate was 200. After a while, I was able to swim a kilometer in the waters of Montauk, Long Island, near my hometown.

I was wearing my Speedo racing shorts when I got up and I felt like the Incredible Hulk.

At the end of this presentation, I want you all to feel like the Hulk.

You can become a long-distance swimmer, learn multiple languages, become a tango champion if you want to.

Today I will introduce my special skill

It's about analyzing things that are scary and helpless.

let's get started

swimming first principle

This principle is very important

People who don't get results are trapped in false beliefs and unproven assumptions.

For me, it all started when a friend of mine, who drinks six double espressos a day, said, "I'm going to give up coffee for a year - when you swim a kilometer in the ocean."

my challenge has begun

I looked for triathletes because I realized that people who are serious swimmers are not very good at teaching.

I also practiced on the beat board

My feet cut the water like a razor and I couldn't move on. I lost my motivation and just stared at my feet

I also tried hand paddle

It was useless to be taught by an Olympic athlete

Now I met my best friend, Chris Sacca, who finished an Ironman race in 39 degrees, and he said, "Maybe I can help."

For introducing me to Terry Laughlin, founder of Total Immersion Swimming.

learning from biomechanics

I learned the correct way to swim For those who are afraid or not good at swimming

Forget about the legs first, you might be surprised

Legs don't provide much propulsion.

Kicking hard isn't the answer.The average swimmer can convert only 3% of his energy into propulsive force.

The problem is water resistance.

The thing to remember is to let your upper body pull your lower body, like a small car behind a big car.

and try to keep your body horizontal

That's why you shouldn't swim on the surface

Due to density, 95% of the body is naturally submerged in water.

Rule number three, when you're crawling, a lot of people try to get to the surface on their stomachs.

A fluid rotation from right to left is correct. Try to keep your torso straight.

Let's take an example. He's Terry.

I have my right arm outstretched, but it's lower than my head and it's extended far forward.

whole body in water

Extend your arms below your head

The head is in line with the spine, and the water pressure will float your feet, which is especially important for people with low body fat.

Stroke example

Feel the leg return rather than kick

stretch your left hand

return left leg

thereby rotating the hips

Regarding the flooded position on the right hand, instead of drawing water directly in front

I'm going to put my arm in at a 45 degree angle, and I'm extending it so that it doesn't get any resistance from the water.

The above is wrong, most swim coaches will tell you this.

Of course they are not responsible

I'll talk about the "front and back" later.

By doing the swim I've described below, you can go from 21 strokes at 20 yards to 11 strokes, in two practice sessions, without a coach and without a video.

I really like swimming now

I would like to give swimming lessons to anyone who wishes.

Finally, take a breather. This is the part that is problematic for many people.

The cure for this in crawling is to watch your hand go into the water when you rotate your body.

This alone makes it much better

this is all that matters

Language Material vs Method

Like many people, I thought I was bad at languages.

I struggled with Spanish all through middle school and high school, and the only phrase I knew was "Donde esta el bano?" (Where's the bathroom?)

) and I don't understand even if you reply. It was a sad reality.

When I changed schools in the second grade, I was able to choose another language.Most of my friends were taking Japanese.

I decided to take the Japanese course to challenge myself.

After 6 months, I got the chance to go to Japan.

My teacher told me not to worry

"We have Japanese classes every day, so you should get used to it.

It's going to be a great experience." It's my first time abroad.

I left on the advice of my parents

It was a wonderful feeling when I arrived in Tokyo

It was strange to be on the other side of the world

I also met my host family It was a good start

The first night, the day before school started, I politely asked my host mother to wake me up at eight o'clock.

"Please wake me up at 8 o'clock" Instead of "Please wake me up", I said "Please wake me up at 8 o'clock". It's similar, isn't it?

The meaning is "Please rape me at 8 o'clock"

(Laughter) I've never seen a Japanese woman so confused.

(laughter) walking to school

The teacher gave me some paper

I can't read it at all. It's like hieroglyphics.

When I asked the teacher what was written

The teacher explained, "Okay, okay, world history, mathematics... ancient literature."

It was there that I first noticed

It seems there was a little misunderstanding

A Japanese class is not a class that teaches Japanese.

It was a class for ordinary Japanese high school students, and 4,999 of the students at that school, excluding myself, were Japanese.

my reaction was like this

(Laughter) And that's what made me start looking for ways to learn languages.

I tried everything. Go to Kinokuniya

I've read every book and listened to every CD

It had no effect. Until I found this.

This is a list of commonly used kanji, a poster with 1945 common kanji, established by the Ministry of Education in 1981.

For readability, the kanji used in most publications are limited to those found here

This was a great treasure for me.

As soon as I started studying this material intensively, my level went up.

I was able to read the Asahi Shimbun. Six months later, or 11 months in total, I finished Japanese I through Japanese VI.

I returned to the United States and started working as a translator at the age of 16. Since then, I've experimented with about 10 different languages, focusing on material rather than method.

A person who was not good at languages ​​became able to speak, read and write five or six languages.

What this means is that it's not about how you do it, it's about what you do.

So it's the difference between being "effective" - ​​doing what's important - or being "efficient" - doing well, even the things that don't matter.

This is also true for grammar

Through experimentation, I've come to use these six sentences

By having a native translate these into past tense, present tense, and future tense, you can analyze the grammar, so you can understand subjects, objects, verbs, the position of direct/indirect objects, gender, etc.

If you want to master multiple languages, just swap these rules around.

For those who are interested, let's talk about it in detail

now i love languages

Ballroom dancing front or back is very important

Someone I thought was good at ballroom dancing

You're wrong. My body isn't good at most things. It's only good for lifting rocks.

I used to be bigger and more muscular

So it was this way of walking

It looked like an orangutan. Might as well be the Incredible Hulk.

Not suitable for ballroom dancing

In 2005, I was in Argentina and attended a tango lesson. I didn't feel like dancing.

I paid 10 pesos and went in. There were 10 women and 2 men. That's a good percentage.

The teacher said, "Do it yourself"

I suddenly had a cold sweat

(Laughter) Actually, I did ballroom dancing in college, and I stepped on someone's foot with my heel, and they screamed.

I was shocked and deeply hurt by her reaction and never returned to that club.

A female teacher approached me

"Come on, turn your hand"

She was a beautiful assistant teacher.

I was angry because I was disturbed by the senior class

I tried my best, but I don't even know where to put my hands

She put her hands on her hips, turned around, and said in a voice that echoed throughout the classroom, "This guy's got a bunch of muscles -- he's got a grip like the French!" (Laughter) I took that as encouragement.

(Laughter) I was laughed at and embarrassed.

She said, "Hurry up. I'm busy."

I've been wrestling since I was 8 years old, and I hugged her like a man with the momentum to crush her.

She looked up at me and said, "I'm fine."

I paid one month's monthly fee

(Laughter) And as a further goal, I decided to enter a competition. Parkinson's Law: The complexity of a task increases until the allotted time is exhausted.

Aiming for the upcoming competition

First, I had a female teacher teach me how to lead a woman, and I tried to avoid college nightmares by knowing the nuances and skills of being led.

Together with her, we explored the characteristics and techniques of past winners.

Interviewed champions teaching in Buenos Aires

As a result, I have created two lists, one is a "table" list of techniques and training they explicitly recommend.

The other is a "behind-the-scenes" list of commonalities they don't do.

Leaving aside the conservatism of the Argentinian dance teachers, I decided to attack the three things they didn't recommend.

First is the long step Many tango dancers use the short step

But I found the long steps more elegant

You can do this step even in a small space

The second is a strange kind of pivot.

The third is the change in tempo.

I thought that if I conquered these three areas, I would be able to compete with dancers who have been doing it for 2-30 years.

This photo was taken four months later at the Buenos Aires Championships, semi-finals.

A month later, I made it to the semi-finals of the World Championships. Two weeks later, I made that Guinness World Record.

let's see practice

fast forward a minute

This was chosen by Elisha and I as Reid's teacher—

I'm Gabriel Mise

One of the most elegant of his generation, famous for his long steps, tempo changes and pivots.

Elisha is also very famous

It's clear that you two are a match

This video is actually from the first time they danced together, and he takes a strong lead.

If you lead with your chest, you will lean forward.

I can't lead well with the strength of my toes

So I was taught to lead with my shoulders and arms.

said to be able to lift her

There are also advantages

I analyzed this move.

This is a kind of pivot

back step pivot

there are many types

I've sorted through all the hundreds of hours of footage, the way George Carlin sorts his comedies.

I learned to tango in Spanish, my nemesis

Fear is your friend and barometer

Sometimes it indicates "what not to do"

They often tell you what to do

My greatest accomplishments, my happiest times, have come from a single question: "What would be the worst thing if I did this?"

To overcome fears, especially from childhood

Throw your analytical framework and your abilities at the object of your fear.

And dream big

Now let me tell you what I'm afraid of

I'm scared of what my life would be like if I hadn't had the learning opportunities I've had so far.

For the last two years, I've been analyzing the American public school system and looking for fixes.

We did a trial with about 50,000 students. We also built about six schools.Thanks to our readers.

All who are interested, let's talk

i'm a newbie i don't know anything

I have a lot of questions. Please give me some advice.

thank you

(applause)

It's simple: after 35 years of rock climbing, I've found nine rules.

just the basics

One, don't let go. it's pretty useful for success

However, it is true that the mind begins to think about giving up and letting go before the body does.

So if you don't let go, imaginative solutions will come to mind.

Two, don't hesitate

This is the Friction Climb in Yosemite's Tuolumne Meadows

There is no solid hold on friction climbs

Climb using grainy holds and small potholes in rocks

The time when there is the most friction is when you put your foot or hand on the rock for the first time.

After that it's basically in a falling state

It's good to have momentum Don't hesitate

Three, have a plan

This is a route named Naked Edge in Eldorado Gorge outside Boulder

The climber in this photo is climbing the last pitch

Right around where I fell

About 305m above the ground

In fact, the key pitch has already been climbed

A common thing is to think too much about "What should I do?"

What happens then?

Reaching the last pitch and it's an easy route

I have completely exhausted my physical strength and energy here.

You need to plan ahead to reach your goal

At the same time, don't forget that you need to complete each move one by one.

It's called the Dyklute route, and it's in Yosemite's Villa Dome.

The interesting thing about this route is that it's not too difficult.

But when you're leading, the hardest part is rolling down a gentle rock surface for about 30 meters.

so it's important to focus

Like Coleridge's Kubla Khan, don't stop halfway

must keep moving

5. Know how to rest

A great climber finds a place to rest, regains his composure, regains concentration, and continues climbing by positioning his body in even the most challenging situations.

Route in Needles, California

It's not good because when you're feeling scared, you're not focusing on what you're doing.

It's more like you're thinking about what you're going to do wrong. For any move to succeed, the thinking ability must be thinking about how to accomplish that move.

When climbing, most people start climbing in the way that feels most natural.

This is Wyoming's Devil's Tower, and you may know it because it came out of Encounters of the Unknown on a basalt neck.

Here, crack climbers put their hands and toes into cracks in the rock and start climbing.

The crevice is too small to put my toes in, so I manage to put my fingertips into the crevice and push my foot up to push myself up.

8, power is not enough

I've been guiding climbing for 35 years, teaching indoor walls and stuff, and the most important thing I've learned is that men always try to pull up.

A first-time climber struggles, struggles, struggles, climbs about nine meters, and most people can do 15 pull-ups, right?

Women try to use their sense of balance more, because they don't assume they can do 100 pull-ups in the first place.

I try to put as much pressure on my feet as possible, which is natural, because my feet support my body all day long.

So balance is really about trying to put your weight on your leg, which is made up of the strongest muscles.

and the ninth

I discovered the ninth rule when I suddenly fell 12 meters without even thinking about falling and cracked my ribs.

The moment you know you're going to fall, you have to start planning how you're going to fall, because that's the most important thing you can do to avoid getting hurt. How do you fall with a rope?

Stop dwelling on what you're holding on to

thank you

(applause)

I'm going to talk to you today about a project I've been doing with my twin sister for three and a half years.

We are crocheting coral reefs

This project is currently being attended by hundreds of people around the world, and thousands of people are involved in many ways with this project.

The project spans three continents, with roots in mathematics, marine biology, women's handicrafts and environmental activism.

It's true

This project also helps us understand the evolution of life on Earth, especially as of February 2009. I think this is a great theme because, as someone said earlier, 2009 is the 200th anniversary of the birth of Charles Darwin.

I'll tell you all that in 18 minutes.

I'll show you a picture first to get an overview.

The work you see here is 1.8m wide and about 60-90cm tall at its tallest.

We also have this

The work on the far right is about 1.5m high

There are hundreds of kinds of crochet coral

Now, as part of this, thousands of crocheted corals have been donated from around the world.

In total, the people involved in this project have worked tens of thousands of hours, 99 percent of which are women.

On the right is a part of the work that's about 3.6 meters wide.

My sisters and I started this project in 2005, when, at least in scientific publications, there were many articles written about global warming and its impact on coral reefs.

Corals are very delicate organisms and will die if the sea temperature rises even slightly.

Coral fading is the first sign of disease.

If it stays bleached or if the water temperature doesn't cool down, the reef will die.

The situation on the Great Barrier Reef is dire, and coral reefs around the world are declining.

This is a work of bleached coral reef

We run an organization called the IFF, whose mission is to promote the beautiful and romantic aspects of science and mathematics.

I posted an online call for participation in this project.

To my surprise, I got a call from the Andy Warhol Museum.

They wanted me to participate in an exhibition about global warming.

I laughed and said, "I'm just getting started, if only for a little while."

So in 2007, I did an exhibition, a small exhibition of crocheted corals.

After that, I received another request, "The theme of the 2007 art and culture festival to be held in Chicago is global warming. I have an 84-square-meter gallery, and I want you to fill it with coral reefs that you make."

At this point, my thoughts were sweet and I answered, "Of course."

I say naive because I'm a science writer by profession.

writing about the cultural history of physics

I've written books on the history of the universe, books on the history of physics and religion, and I've written articles for the New York Times and the Los Angeles Times.

That's why I didn't understand how difficult it was to fill up the 84 tsubo.

I gave two replies.

When I go home and tell my sister

She was furious because she was a professor at the California Institute of the Arts, and she knew how hard it was to fill up an 84-square-meter space.

My sister is angry, but fiercely

started crocheting

Long story short, eight months later, we've filled a 84-square-meter gallery at the Chicago Cultural Center.

By this point, the project had expanded more and more than I could have imagined.

People in Chicago said they wanted to build their own reefs in addition to our reef exhibit.

We hold workshops and teach how to make

The people of Chicago built their own coral reefs.

Displayed alongside our work

hundreds of people involved

We were invited to do the same in New York and London and Los Angeles.

Hundreds of local citizens built coral reefs in each of those cities.

More and more people are joining us, most of them meeting people for the first time.

So this project has become an ever-growing organism that transcends my sister and me.

Well, is there anyone who thinks like this? “Why are these people

Are you crocheting coral?

Yarn and water feel like a mismatch

why carve marble

Can't you make it out of bronze? ”

And that's one of the big reasons we crochet. Coral reefs are full of uniquely shaped creatures.

The pleated shapes found in corals, seaweeds, sponges and nudibranchs are a type of geometry called hyperbolic geometry.

For mathematicians, the only way to reproduce this structure is by crocheting, and that's a fact.

This structure would be nearly impossible to create any other way, including a computer.

So corals and nudibranchs represent - to explore what hyperbolic geometry is.

Next few minutes let's all level up to the level of a sea slug

(Laughter) When hyperbolic geometry was discovered in the 19th century, mathematics was revolutionized.

Mathematicians couldn't form it until 1997.

In 1997, Cornell University mathematician Dana Taimina discovered that this structure could be reproduced in knitting.

she used a stick first

I had too many eyes, so I realized that crochet would be a good fit.

She's created a mathematical structure that defies mathematicians' notion that it's impossible to reproduce.

Originally, this kind of structure was thought to be impossible.

Even the mathematics authorities spent hundreds of hours proving the impossibility.

What makes hyperbolic structures so?

Before hyperbolic geometry came out, the two spaces that mathematicians knew were Euclidean space and spherical space.

both have different characteristics

Mathematicians are formalists, so they like characterizations.

Do you understand the meaning of a plane, the so-called Euclidean space?

But mathematicians use the concept of parallel lines

defines Euclidean space

There's a line here, and there's a point on it.

I ask in Euclid's definition

How many lines pass through this point but do not intersect the straight line?

can someone answer?

yes it is 1

That's the definition of parallel lines

The definition of Euclidean space is

There is another possibility, which is spherical space.

Think of the surface of a sphere like a beach ball or the Earth.

A straight line is drawn on the surface of the sphere.

There's a point on top of it. How many lines can pass through this point that don't intersect a straight line?

What is meant by a straight line on a rounded surface?

Mathematicians have the answer

There is a generalization of the straight line - called a geodesic

The longest circle that can be drawn on the surface of a sphere is a straight line.

Imagine the equator and meridians

I'll ask you again: How many lines pass through a point but don't intersect the original line?

can someone guess?

yes it is 0

mathematicians thought it was the only option

These two answers are a little dubious: 0 and 1.

there may be a third answer

If a mathematician has come up with an answer, and it's 0 and 1, then there's a third option that I can immediately suggest.

can someone guess?

infinity everyone is correct

the third option is

looks like this

There is a straight line, and an infinite line passes through the points and never intersects the straight line.

this is the figure

Indeed, mathematicians were puzzled by the fact that the line is arcing.

I felt cheated

But that's just because it's projected onto a flat surface.

How did mathematicians do this for hundreds of years?

I struggled to see if I could shape it

It's hard to imagine with only graphics, but think of it this way.

For those who only know Euclidean space

Suppose we talked about the existence of a sphere where straight lines always intersect at the north and south poles.

to tell you what it looks like

If you tell them to look at the ball

from sight and touch

you can understand what a sphere is

And that's exactly what Dana Taimina did in 1997, when she proved that crochet can create hyperbolic space.

Here's a crochet diagram

I sewed the parallel postulates of Euclidean geometry onto the surface

The line looks like it's curved

You can prove that it's a straight line by picking a line and folding along it.

a straight line appears

A woman's handicraft proved with yarn that one of mathematics' most famous postulates was wrong.

(Applause) On a surface like this, you can sew all sorts of mathematical theorems.

The discovery of hyperbolic spaces gave rise to a branch of mathematics called non-Euclidean geometry.

This is the branch of mathematics that underlies general relativity, and it shows us what the universe looks like.

It goes from handcrafted by women to Euclid to general relativity.

I mentioned that mathematicians said it was impossible

There are two kinds of creatures that don't know about the parallel postulate, creatures that have lived without knowing it's a problem.

It's been this way for hundreds of millions of years

I once asked a mathematician why he thought this structure was impossible: Nudibranchs have been in this form since the Silurian.

their answers are funny

I was told that it might be because few mathematicians look closely at sea slugs.

It's a valid opinion, but more importantly,

It speaks to the way mathematicians think about mathematics, things they thought they could do and things they thought they couldn't replicate.

Mathematicians are among the freest thinkers of all thinkers, but even they didn't notice the sea slug, lettuce, the pleated vegetables modeled after hyperbolic geometry.

In a way, they have a symbolic view of mathematics, but they didn't notice the lettuce in front of them.

The natural world is full of hyperbolic mysteries

We also found that we could create an infinite number of different shapes of hyperbolic creatures by crocheting.

Our sisters and the project participants set out to come up with a model that was mathematically simple and accurate.

But once we got out of that concrete set of mathematical codes, and we realized that what was at stake was the simple arithmetic of knitting three times and adding one stitch, suddenly the model started to look natural.

These amazing people from all over the world are making their own creations.

In other words, we're evolving an unprecedented crochet family tree.

Just as the complexity of morphology and life on Earth is never-ending, embellishments and complexities contained in the genetic code give rise to new creatures, and similarly small twists create new and wondrous creatures in the work's evolutionary tree.

So this project really came to have an organic life inside.

It's the collectiveness of everyone who participated.

and their personal vision and their connection to this mathematical method.

Use crochet—

what is the motivation and importance

These things represent the importance and value of codified knowledge.

The society we live in tends to appreciate highly symbolic representations, algebraic representations, equations and symbols.

The world we live in is so stereotyped in how we present and teach information.

But crocheting and play with shapes allows us to connect with the most abstract, active, and theoretical ideas, things that you would normally go to college to study in advanced mathematics.

But you can do the same thing with playing with objects.

One of the ways that we're tying play together is what we're trying to bring to life at IFF, and we're trying to bring it into kindergarten for adults.

Kindergarten is a very formal educational system, established by Friedrich Fröbel, a 19th-century crystallographer.

believed that crystals were the model for all expression.

In a radical way, he developed a system where young children could use objects to experience the most abstract concepts.

his achievements are great

Fröbel advocated the value of education through shape-building play.

The world we live in today is filled with think tanks, filled with great people who think about the world.

They write representational things like books and newspapers and commentaries.

Through the IFF, we sisters want to propose another way, which is the Playtank.

Playtanks are like think tanks, where we share great ideas.

But what we're proposing is the highest level of abstraction, where mathematics, information processing, mathematical logic, and so on, can be experienced not only through difficult algebra and symbolic solutions, but through play.

Thank you very much

(applause)

A few months ago we gave our viewers a question.

You're going to ask people to name the integers from 0 to 100, and you're asked to guess the integer that's closest to two-thirds of the average.

If the average is 60, the correct answer is 40.

What do you think is 2/3 of the average number that everyone said?

Let's see if we can make a logical guess.

This game is played under what game theory calls "shared knowledge."

Not only do all the participants know the same information, but everyone knows that everyone else knows, and everyone knows that everyone else knows --

And so it goes on and on, the highest possible average is if everyone guesses 100.

2/3 of the mean is 66.66

We all know that, so guessing anything higher than 67 doesn't make sense.

If everyone came to this conclusion, no one would say a number greater than 67.

So now 67 is the highest possible mean, and it doesn't make sense to say anything higher than two-thirds of that, 44.

This reasoning can go on forever

The maximum logically possible answer is getting smaller each time.

So it makes sense to say the lowest value.

So if everyone chooses 0, the game is in what's known as a "Nash equilibrium."

It's a situation where each of us has the best possible strategy for someone else's strategy, and it's in no one's interest to make a different choice.

But in the real world it doesn't

Aren't humans perfectly rational, or do we expect others to be perfectly rational?

or both

If you actually play this game, the average seems to be somewhere between 20 and 35.

When the Danish newspaper Politiken played this game with more than 19,000 readers, the average score was about 22, and the correct answer was 14.

Our audience average was 31.3

So if you were expecting 2/3 of the average to be 21, you've hit the jackpot.

In economic game theory, this situation of rationality and practicality is modeled as "level-k thinking."

where k represents the number of times the inference cycle is repeated.

People who play at level 0 have a naive way of thinking, randomly guessing numbers without thinking about other players.

A level 1 player, assuming everyone else is level 0, expects the average to be 50, so 33 is the answer.

A level 2 player thinks everyone else is playing at level 1 and expects the answer to be 22.

If you go to level 12, the answer will be 0

Observations show that most people stay at level 1 or 2.

This is a useful finding, because level-k thinking is common in situations where there's a profit or loss involved.

Stock traders, for example, take into account not only the company's earnings reports, but also how other people see those numbers.

In a soccer penalty kick, both the kicker and the keeper decide whether to go left or right based on what the opponent thinks.

The keeper remembers the kicker's past pattern, but the kicker knows it and can decide what to do.

In either case, you have to think about what your best course of action is, depending on how well others think they understand the situation.

Level one or level two is never a sure thing, but if you're aware of those trends, you can adjust your expectations accordingly.

For example, if everyone understands the difference between the most logical way and the most common way, and then play 2/3 of the game, what happens?

Expect 2/3 of the average under these new conditions and submit using the form below Stay tuned for results

(Shah Rukh Khan) Courage, Faith and Unwavering Vision

These are qualities common to people who achieve big goals.

They are also brave people who believe that failure is not an option.

For the next speaker, the vast ocean, which is thought to be unconquerable, is an attractive stage that seems to have been born for it.

Dive right into the story of the fearless speaker Bhakti Sharma is making waves in the world of long-distance swimming.

I'm Bhakti Sharma

(Applause) (Bhakti Sharma) Imagine one hot summer afternoon in the scorching heat of Rajasthan, a two-and-a-half-year-old child riding on the back of her mother's scooter, not knowing where she's going.

Twenty minutes later, the two-and-a-half-year-old is head-to-head in water.

Before I knew it, I was thrashing, screaming, gulping water, desperately holding on to my mother.

That's how I learned how to swim

I started swimming pools at the age of two and a half, and open water swimming at the age of 14.

I've devoted 25 years to this sport, and in those years I've swam all five oceans, crossed the English Channel, been called the Everest of swimming, and even set a new world record in the freezing waters of Antarctica.

(Applause) When you spend too much time in sports, you become more of a mirror than just a sport.

I will show you my true self

It's not just race day that tests your mettle as an athlete. Every day is a test. For sport, I wake up at 4:30 every morning, swim for two hours, go to school, swim for three hours, then come home, eat and sleep.

When I win a medal or break a world record, this mirror not only reflects the happiness of myself and my family, but also the tears I shed alone in the water.

Open water swimming is a very lonely sport.

I've been swimming for hours looking down into the seemingly bottomless ocean, facing only my thoughts.

So I've been tested not just as a swimmer, but as a person who thinks and feels and imagines.

My first test as a long-distance swimmer may have been when I decided to swim 12 hours non-stop in a pool, or when I crossed the English Channel in 13 hours and 55 minutes.

When I'm swimming, I don't speak and I can't hear very well. My vision is limited to what's directly in front of me or directly below me.

This alone time is the greatest gift sports has given me.

Open water swimming helped me get to know myself better than I ever could have imagined.

I remember when I was 14 years old and jumped into the ocean for the first time, and all the while I was swimming, the waves swept me up and down.

When I crossed the English Channel, after more than 10 hours of swimming, the currents kept me stuck in the same spot for over an hour and a half, but I was a strong athlete in me who didn't want to disappoint my parents or my country.

I won India's first gold medal in the open water marathon in Switzerland -- (Applause) -- and there was me as a proud Indian.

When I crossed the English Channel again, I swam in a relay with my mother. I didn't know I was going to go down in history, but I found myself as a daughter trying to protect her mother.

And then four years ago, when I jumped into the waters of Antarctica, wearing nothing but a bathing suit, cap, and goggles, I saw a warrior in me, with the mindset that I was going to make it.

I was prepared physically and mentally to endure the cold when I jumped into 0-1 degree Celsius water, but what I didn't expect was the density of the water.

It felt like I was in oil every time I touched the water.

For the first five minutes, all I could think about was giving up.

How nice it would be if you could forget all this and get on the boat, take a hot shower and wrap yourself in a warm blanket.

But as soon as I thought that, I heard a voice of stronger will from deep inside me.

"One more stroke and you should be fine."

So I raised my arms and paddled the water.

"One more time"

The second time, the third time, and so on

By the fourth time, I saw a penguin swimming under my stomach.

He showed up on my left hand and started swimming with me.

"See? Penguins are rooting for you," said the voice in my heart.

(Applause and cheers) When I look at everyone on the boat

Everyone was smiling just like me

It's that smile that everyone has. It's the smile you see when you see a ray of hope even when you're in a difficult situation.

Thinking that this is the call of fate, I just keep moving forward

Just as I did, 41 minutes later, I set the world record for longest swim in Antarctic waters.

(Applause) Think about it, it doesn't snow in Rajasthan.

(Laughter) That voice has been with me in every difficult situation I've encountered while swimming, but it wouldn't have surfaced until I experienced this much loneliness.

In a situation where you're alone in the open ocean with only your thoughts at your side, the danger isn't just external: it's not just whales, sharks, jellyfish, and demoralizing people.

The more dangerous demons you'll encounter are your inner fears and negative thoughts, which will whisper, "You're not good enough.

It's impossible to reach the other shore

I didn't practice enough

what if it fails? what do people think?

Everyone thinks it's too late."

Everyone has a devil in their heart, right?

In my day-to-day life, I can turn a blind eye because I have work and distractions.

But as I said, there's nowhere to hide in the middle of the ocean.

I have to face the demons inside me, just as much as I tasted the salty seawater, got scratches on my skin, and swam side by side with whales.

It's a very bad experience, but also an experience I love.

I don't like it because through this sport, I can show a side of myself that I don't want to know.

It's the imperfect part of being human.

For example, if I wake up properly in the morning and can't go to practice,

I am completely burnt out and exhausted and want to stop swimming.

But I also love it, because this sport has given me moments of reflection when I'm feeling down.

I feel like getting down on my knees with my heartfelt gratitude

Most of you don't swim for hours without rest.

But who do you spend the most time with?

You probably share the space outside with a lot of people, but we all have a partner who's always with us, and that's ourselves.

Yet most of us don't know ourselves that well.

I'm a daughter, an Indian, a swimmer and a student.

but there are many more

If you don't take time for yourself, if you don't find a way to get closer to who you really are, no matter how "successful" you are in life, your joy and satisfaction won't last.

Even now, when I don't feel joy or motivation in what I do, I ask myself, "Is this the best thing I can do right now?"

The meaning of "best" changes

One day I will not give up and swim in freezing water to set a world record.

But on many other days, it's about getting over those depressing thoughts and getting out of the house and doing your daily chores.

What never changes is the inner voice itself

It's your heart's compass that guides you to a better you every day.

I believe that a truly successful life is a life in which, at the moment of your last breath, you try as hard as you can to feel like, "I'm the best I've ever been."

thank you

(Applause) (Shah Rukh) I'm not very good at swimming, and I sink with a hammer.

When I'm next to the world's best swimmer, I don't know what to say—excuse me for the pun.

It's just the sea- (Bhakti) (laughs) I see!

(Shah Rukh) What is your next goal as a swimmer?

(Bhakti) I'm afraid of competition, so I don't have a goal other than the Olympics.

Open water swimming is now an Olympic sport.

(Applause) Just saying it makes me shudder. It's such a big goal that I don't want to accept that I've set a goal like that, but it's part of the sport.

It doesn't matter if you make it to the Olympics or not, but I think training for the Olympics will make you a better swimmer and a better person.

(Shah Rukh) I'm sure you'll get out of God's will

I want to tell you that there are a lot of people watching this at home -- a lot of people who are really rooting for you, so on the Olympic stage, imagine that we're all swimming together in penguin clothes and saying, "Go! Bhakti, go ahead, go ahead."

(Bhakti) Will you be my penguin?

(Shah Rukh) It's your penguin

Sharks and such were cooler, but penguins too- (Bhakti) Then how about my guardian animal, the killer whale?

(Applause) (Shah Rukh) Everyone, it was bhakti.

(Bhakti) Thank you

(applause)

I fell in love with airplanes when I was five years old.

It's about the 1930's

Airplanes back then had radial engines, pilots who looked like movie stars.

I wore leather boots, fitted pants and a leather jacket, a nice helmet, goggles, and of course a white scarf and flew through the wind.

As if he's going for a walk, he walks recklessly into the plane, throws down his cigarette, and kisses the girl waiting on the ground.

(Laughter) You get into a plane that might crash.

I kept thinking, "What if he kisses the plane?"

(laughs) Well, it was a very realistic dream.

Aviation at the time was probably the most advanced technology available at the time, if you think about it.

Since I was a boy, I always tried to draw airplanes to get closer to my dream.

It was a way to realize even a part of your admiration

In a way, of course, by my admiration, I mean the beauty of the plane as a whole.

You could say that the term is an experience that surrounds a whole product.

In this case, the product was an airplane.

and created a dream

Even aircraft equipment such as Fuselage Empanage Nessal

romantic french names

was attached

it was fascinating

I'm obsessed too

And I was no longer satisfied with just drawing my dream plane.

I really wanted to design

I built a model airplane there.

And when I actually started working on it, I realized that a sketch wasn't enough.

I couldn't create a model from a drawing

To fly, you had to learn the laws of flying

So I needed aeronautics.

I had to learn what makes a plane stay in the air.

Of course, you can't control the model at that time.

In order not to crash, it had to be automatically restored.

As a result, I had to give up the sketches that I had just imagined in my head, and I needed to create a blueprint for the shape of the wing and fuselage.

Through trial and error, we were able to create an aircraft that could fly.

Only when I fly in the sky, I can feel my dream

I've drawn airplanes, so I decided to attend an aeronautical engineer class as an elective in school.

When I went to class, I was surprised because I didn't have a chance to draw an airplane.

I had to learn math and mechanics.

I drew an airplane by myself while going to class

One day, a young man peered over my shoulder and said, "You're good at drawing.

Isn't art club better? "

When asked "Why?"

"There are a lot of girls over there."

(Laughter) And that temporarily turned my yearnings around.

(Laughter) Sketching was also appreciated, so I moved on to art.

I also studied painting, but I wasn't very good at it.

I studied design and architecture there.

And I ended up making a living as a designer.

For the next 25 years, I've shared my passion for the aesthetics and experiences surrounding this design with anyone who lives in Italy or the United States and pays the price.

There is such a thing as romance

As anyone who drives a car knows, there's an aura about high-performance racing cars.

For 25 years, I've been working on that feeling, and I didn't do a lot of design that was immediately useful, because the environment didn't allow me to make things that I could put my heart into.

After working on it for 25 years, I started to feel something was missing.

so i stopped

In order to reconfirm my original intention, I dissolved the organization of 40 people and started working alone.

I wanted to secure a place that I could cherish.

At the time, I was working on airplane interiors, but my love for airplanes had already faded, so I had no choice.

I chose the furniture

I've been interested in it for a long time, so I chose the chair.

I've designed chairs for tractors, trucks and submarines over the years.

I had no experience with office chairs

I started designing

And then I discovered that I could design it using a similar approach to airplanes.

But unlike being shaped with the wind in mind, it's shaped to fit the human body.

So, essentially, with an airplane you have to learn how to deal with the wind, but with a chair you have to learn how to deal with the human body.

Ultimately, after some trial and error, I ended up designing the chair you see here.

In addition, the model planes were all done by me.

Imagine what kind of airplane it is

after designing

made

and try to fly

that's how it works now

When I set out on this chair, I had no preconceived notions.

If there is such a thing as a modern design trend, we generally don't start with a sketch of the exterior.

About eight or nine years ago, I started with a vague idea.

It got me thinking about the people who work in the office. Most of the people who work in the office, the sedentary people, sit in front of a computer all day long.

So I felt that the chair you sit in shouldn't be something that makes you less efficient at work.

So a chair shouldn't be functionally and ergonomically stressful for the person sitting in it.

The idea is not a chair where you have to sit down and then reach for different levers, but a chair that automatically reclines to the right position when your weight is on it.

Some may not find it convenient

But the classic chair reclines to adjust the angle between the legs and upper body for better breathing and circulation.

If you sit in my chair, it doesn't matter if you're short or tall, you don't have to look for levers or anything like that, because the power you need to recline is transmitted to the chair while maintaining your balance.

Of course, I will also clearly state the price.

there are drawbacks

I can't handle everyone

Some people are very light, some are very heavy, and some have very developed upper bodies.

I can't handle people like that.

But we have to compromise on that, given that most people won't need to adjust.

No adjustment required

One day I met a man on the bus who bought me a new chair.

told me about my sister

After "great" she added

"But it's too high to sit on."

(Laughter) So he said, "I'll take a look."

he came and checked the chair

When I pulled the lever, the seat went down.

"Wow how did you do it?"

he showed the lever

This happens a lot when you work with chairs.

Why would you need a 20-page instruction manual to operate a chair?

(Laughter) The manual for the watch was 20 pages long.

Anyway, what I thought was important was to eliminate the adjustment in reclining.

I also don't think that armrest improvements have been taken seriously until now, how much help they can actually be in the workplace.

On the other hand, I didn't think it was a good idea to ask the user to adjust the armrests.

So I've been thinking

Will it take about 8 to 9 years?

These things were always in my head, and I thought about each one, but eventually I started working on it as a problem.

We spent a lot of time trying to come up with armrests that would easily rise and fall in larger arcs without pressing a button.

After some trial and error, I came up with a very simple way to operate the armrests.

easy to lift

stop where you want it to stop

push it down out of the way

You can also remove the armrests

Can be lifted to any position

It's not as dramatic as a movie star, but I also felt the need to add a little bit of aesthetic essence and great performance to the product.

Then I became interested in the fact that the reclining function is an important component.

The deeper the reclining angle, the better.

The bigger the angle here and here, the better. Especially now, when you have a screen in front of you.

Everyone, put your hands behind your back and touch your sit bones.

(Laughter) Do you touch bones?

(laughs) Keep it to yourself.

(Laughter) There should be one on each side.

When you sit down, the weight of your upper body, such as your arms and head, should rest on your sitting bones through your back and spine.

huge load

You can reduce the load by 20% by releasing the weight of your arm into the armrest.

If you can't hold your spine in the right position, it will bend in an undesirable way.

So if there's really a big load, you can get away with this and you can recline.

Reclining allows you to transfer the load on your buttocks to your back

Open between the legs and the torso

it's also good for breathing

But if you recline even a little bit, you'll need a headrest because you're going to have to keep your head upright.

Head tends to stand up when reclining

If you recline too much, you have to use your muscles to support your head.

You will need a headrest

Now, with this headrest, there's a challenge, because you have to cover your head beyond the barriers of height and gender.

Here is the solution

5 inches of adjustment width for correct adjustment

On the other hand, I knew from experience that in the office, even if there were headrests, no one would turn the knobs to adjust them.

In addition, it is necessary to change the position when the backrest is upright and when it is lying down.

The only way to solve this problem was to automate

If you look at this chair, as you recline, the headrest lifts to support your neck.

Ideally, it should support the entire skull, around here.

So it took a lot of time to develop.

There are other seating issues From the bicycle saddle

I borrowed the idea and used gel on the seat and armrests to distribute the load rather than concentrate it on one point.

Even if you put your elbows on it, you won't hit the bottom

I wanted to demonstrate that this chair can actually provide comfort to the person sitting in it.

It doesn't matter who sits, short or tall, with just a few adjustments you can get the perfect fit for everyone.

(applause)

It may be hard to believe that from your grandmother's fearless tales of her youth, she was once a trapeze rider.

But back pain, sore elbows, and creaking knees, common in the elderly, aren't just "getting old."

In fact, many young people also suffer from this cause of creaking.

The culprit is arthritis, a disease that causes inflammation and pain in the joints and affects more than 90 million people in the United States alone.

But are stiff joints and creaking really inevitable?

Why is arthritis so prevalent? Why haven't we found a cure yet?

The first problem is that arthritis actually encompasses over 100 different inflammatory joint diseases.

Joint pain and inflammation are common to all of these diseases, but the causes and severity of symptoms vary widely.

Even the most common condition, osteoarthritis, is harder to prevent than most people think.

It's a common misconception that arthritis is only for the elderly.

Osteoarthritis is often caused by seemingly normal joint damage in childhood.

As soon as immune cells are injured, they begin to release (degradative) enzymes such as "matrix metalloproteases" and "aggrecanases" to remove and repair damaged tissue.

These enzymes remove damaged tissue and cause inflammation.

But while this rapid swelling protects the healing joint, if the tissue doesn't heal enough, these immune cells can linger and become a nuisance.

The excess enzymes then begin to break down cartilage, weakening joints and later causing arthritis.

All types of arthritis aren't just caused by past sports injuries.

Let's look at rheumatoid arthritis, which affects 1.3 million adults in the United States.

This disease is actually an autoimmune disease in which autoantibodies target self proteins, some of which are secreted by chondrocytes.

We don't yet know what causes the autoimmune reaction, but as a result, the body treats joint tissue like a foreign enemy.

Immune cells infiltrate joints even though there is no damaged tissue to repair them.

This reaction causes chronic inflammation that destroys bone and cartilage.

Yet another disease, spondyloarthritis, shares similarities with the first two diseases.

People with spondyloarthritis have persistent inflammation in their joints and where ligaments and tendons attach to bones, with or without previous injuries.

This results in the same hypersecretion of enzymes and tissue degradation seen in osteoarthritis, but this is stimulated by different inflammatory proteins called cytokines.

As the enzymes eat away the cartilage, the body tries to stabilize it by fusing small joints.

During this process, sometimes projections called osteophytes form, leading to severe movement limitations and joint pain as well.

Because there are so many causes of arthritis, current treatments are symptomatic rather than causal.

There's also the promising one called MACI, an transplantation technique that takes cells from a small piece of cartilage and grows a replacement tissue.

Another method is called "microfracture," where a surgeon makes a small hole in the bone and allows bone marrow stem cells to migrate and form new cartilage.

As a last resort, people with depleted cartilage can undergo joint replacement.

Beyond these ambitious therapeutic modalities, the pathogenesis of autoimmune arthritis may offer unique therapeutic targets.

Scientists are now developing treatments that block TNF-alpha, one of the major proteins that cause inflammation in rheumatoid arthritis.

But even this approach is symptomatic, not causative.

In the meantime, the best ways to prevent arthritis are lifestyle choices: maintain a healthy weight to reduce stress on joints, low-impact exercise like yoga or cycling, and quit smoking.

As research continues to find cures for a wide variety of arthritis, these actions in combating arthritis can lead to healthy longevity.

i am an astronaut

I flew twice on the Space Shuttle and lived on the International Space Station for nearly half a year.

There's a question that everyone asks, "Hey, what does space look like?"

as if it were a secret

I hope I can tell you that the universe belongs to everyone and why it's such a magical place.

After my 50th birthday, I boarded a Russian rocket and went into space.

Launching is the most dangerous part, but also the most exciting moment.

3, 2, 1, launch!

I could feel every controlled explosion of the rocket engine as it launched from the ground.

The rocket accelerates faster and faster. After eight and a half minutes, the engine shuts off.

It's the beginning of a mission and a magical time.

Dimitri, Paolo, and I will approach the space station cautiously as we orbit the Earth in our little spacecraft.

It's an exquisite dance at 28,000 kilometers per hour. Our spacecraft is about the size of a small car, and our space station is about the size of a football field.

When these two dock, we arrive.

We open the hatch, fluff and hug in zero gravity, and now we're six.

Your impromptu space family is ready.

The good thing about living in space is being able to fly

that is fun

I feel like I've become peter pan

not just floating

With one push of my finger, I can fly to the other side of the space station, and I'm holding myself on my toes.

My favorite is when I'm drifting quietly around the space station at night.

Sometimes I wonder if the station knows I'm there, there's just silence.

It was also important to me to share that excitement with other crew members.

A typical day in space begins with a nice commute.

I wake up, head to the lab, and say good morning to the perfect morning view.

It's a short 30-second commute, and I never get tired of the view out the window.

reminds us that we are so close to the earth

We were the second team to catch a supply ship with a Canadian robotic arm, about the size of a school bus, loaded with about a dozen kinds of lab equipment and chocolates that we haven't seen in months.

Chocolate aside, each and every one of those experiments can answer scientific questions that you can't do on Earth.

It's like a lens that shows us the answer to the question, "What happens to combustion?"

"What happens to fluid motion?"

it is comfortable to sleep

You can sleep upside down or on your right side, but my favorite is sleeping curled up and floating.

What about laundry? won't

The dirty clothes are loaded onto an empty supply ship and sent out into space.

What about the toilet?

everyone wants to know

It's hard to understand, so I made a short video because I wanted my kids to know how useful the vacuum principle is.

really helpful

(Laughter) Of course we recycle.

collect pee, store it, filter it, drink it

that's delicious

(Laughter) We eat around the table. It looks bad, but it tastes pretty good.

Whether it's in space or on Earth, it's important to gather around the table together.It strengthens our bonds.

Music was my way of staying connected to the world.

To celebrate the 50th anniversary of manned spaceflight, I played a duet on Earth and in space with Ian Anderson of the band Jethro Tull.

Communication with family was very important

I talked to my family almost every day while I was in space, and I even read to my son, just to be together.

it's important

As the space station passes over Massachusetts, the family goes outside to look for the brightest star across the sky.

I looked down and couldn't see the house, but the fact that I was staring at the people I loved was what mattered to me.

For me, the space station is where mission and magic come together.

A mission is an important step in getting out of Earth, and it's also essential in knowing how to protect the planet.

I loved being able to work for that, and if I could take my family with me, I would like to stay forever.

The view from the space station taught me that we're all from the same place.

that we all have a role to play

because the earth is our ship

Space is everyone's home

We are the crew of Spaceship Earth.

thank you

(applause)

Like many people around the world, this summer my friends and I were obsessed with the Women's World Cup in France.

As we watched, some of the best athletes scored exhilarating goals, no fouls, and it was a thrilling match. Meanwhile, off the field, the same players were advocating for equal pay.

We were so excited that we wanted to see the game in real time, so we decided to watch it on a Spanish-language channel that was airing in our country.

So, while I was watching some games, one of my friends suddenly said, "I feel like I'm only watching commercials for cosmetics, detergents, and diet products."

I don't know if it was because we cared too much, or if it was because we were watching it with men, but it felt like it was too obvious that the commercial was aimed at women.

it's not necessarily wrong

Someone saw the game and said, "This is probably meant to be watched by women, because it's a Spanish-language channel with Hispanic women, and it's a women's game.

In other words, it's the perfect place to run commercials focused on women."

As a marketer, I knew very well that this phenomenon was inevitable. Marketers were just doing their job.

Because you're on a very tight budget and you have to brand, it's tempting to lump all your potential targets together so you can target them faster.

It's kind of like a shortcut

We use gender classification as a shortcut to target consumers.

It's a seemingly rational idea, but there's a problem: gender classification isn't really a good shortcut.

In this day and age, if you're marketing blindly by gender, it's plain stupid.

It's a problem that goes before the emphasis on gender stereotypes in advertising, which is a real issue that has been the subject of criticism for its own sake.

Apart from that, the reason gender classification is stupid is that it's a waste of money.

Gender is too easy to narrow down, target, or argue with consumers, and it distracts from other beneficial factors that can help you grow your business through your brand.

So gender-centric marketing is the double misfortune of being bad for business and bad for society.

Until now, gender has been viewed as a useful shortcut in marketing, along with other statistical categories.

But somewhere along the line, we forgot that the core of our target needs were, in essence, cooking, cleaning, grooming, cars, sports, and so on, and lumped everything together, and decided that all we had to do was differentiate between men and women.

I've gotten so used to it that I don't even question it anymore. What's really interesting, and I find it absurd, is that this sort of categorization still works.

I'm not saying that without backing it up.

There's enough data to show that it's not wise to look at gender first when designing and targeting brands.

To take it even further, unless you're in a very gender-specific product category, gender is probably the least useful way to classify consumers compared to any other classification.

I didn't bother to prove this conclusion.

was discovered by chance

Consulting is about understanding your business and finding opportunities to grow your brand.

And we believe that if you want your customers to grow dramatically, you have to start with a clean slate of minds about the consumer.

We have to let go of our prejudices, let go of the categorizations we used to think make sense, and start from the ground up and see where there's room for growth.

we developed an algorithm specifically for that

For example, if a person makes a choice about a product or service, the information about that person includes not only gender, but also other disaggregated information, such as where they live and how much they earn.

The background information for the choices that person makes includes where and who they were with, and how they're feeling at the time, but you can add a lot of other factors.

We can learn about the consumer's own preferences, how they react to categories, how they act.

Imagine big data like this, a collection of personal information, and very broadly, we built an algorithm that played a tournament of statistical information.

So it's like asking, "Hey Data, out of all the information you know about consumers right now, what is the most useful thing that tells you more about their needs?"

Tournaments have winners and losers

The winners are the elements and dimensions that give us the most information about the consumer and help us understand their needs.

The less practical elements are the losers. This sorting is important. Budgets are finite.

It's pointless to separate approaches.

Now, you know what's going on, because I just told you, but anyway, what we've discovered is that after 200 projects in more than 20 countries, and maybe 100,000 statistical tournaments, as you can imagine, gender is very rarely the best predictor of consumer needs.

Of the roughly 100,000 tournaments played, only about 5% judged gender as a winning factor.

By the way, this is a common truth all over the world.

We've done the same thing in regions where traditional gender roles are relatively distinct, and the results are exactly the same.

Gender is slightly more important than 5%, but it can't be used as a factor.

What can be said from this fact

No matter what angle you look at consumer analysis, any other classification is likely to be more useful than gender.

There's got to be some kind of important information to know about the consumer, but if you're thinking about everything in terms of gender, you're missing out on the important information.

That's why I said it was a waste of money

Gender is easy, it's easy to design ads based on gender, and it's easy to segregate online and TV audiences by gender.

But in the end, dramatic growth doesn't come out of it.

For example, some of the most important factors for food companies are where consumers eat, who they eat with, and whether they care about nutritional balance.

All of these factors are far more useful and practical than knowing your gender.

Classification choices are important, because we're spending a limited budget on marketing, so it's better to think about solutions for different uses rather than splitting between women and young men.

Another example is alcoholic beverages

35% to 45% of alcohol consumers in the world are actually women.

It is often said

But in reality, most of the time, the emotional and physiological needs that men and women can have in the same situation are very similar.

But there is one exception. Yes, there are exceptions. Men and women on a date.

Men and women are often talked about in the field of finance, but in reality, categorizing men and women as different distracts from the underlying factors.

It's very loosely said, "Women don't like investing," "Women don't like managing money," and "Men are risk takers."

it's in another place

It's the difference between people who have interest, leeway, and knowledge about asset management, and people who don't.

So if we move the discussion away from gender inequality to something more substantive, perhaps we'll change the disdain for women, and maybe we'll turn those men who are defensive about investing into customers.

Let me give you another example

Going back to the female athletes I talked about at the beginning, when we did some research on sporting goods, one of the interesting findings that we found across countries was that when competitive people are physically active, there is no difference in needs between men and women.

an athlete is an athlete

Whether you're a man or a woman, young or old, you're an athlete, and you're competing in a tough competition, and you need sports equipment that works.

Women and men in soccer have a lot in common.

Talk outside the stadium doesn't matter

People have different clothes, hobbies, etc., but there is no difference between men and women when it comes to sports.

These are just a few examples of the many areas in which we've identified that gender classification isn't optimal. The point here isn't to promote feminism, it's just that we've grown accustomed to gender classification.

To get out of this situation and not go back, it's important to start looking for non-gender metrics about consumers.

I'm a pragmatist, so I understand that you still want to use gender classification, and you still think it's easy to use, but it's clear that we should argue against it.

Businesses should ask whether gender classification is really the best perspective for growth.

So if you're in business like I am, and you're constantly wondering what your role is in the wider debate that's going on in society, and you hear conversations like this in your own business: "I'm targeting women. I'm targeting men." "This is for girls. This is for boys." It will only encourage the idea that women and men are different.

And since we're talking about a business here, and you want to grow it, at least resist the temptation to use gender classification, because statistics show that gender is probably not the best metric for targeting services and products.

Growing up isn't easy at all

I don't understand why you think outdated perspectives like gender classification are valid in the consumer market.

Let's stop falling for the easy and move on to the right

Because it's good not only for business, but also for society.

thank you

(applause)

I would like to talk about the election

It was the first time that a large number of white voters had voted for an African-American presidential candidate.

Obama actually did pretty well

received 375 electoral votes

And with about 70 million popular votes, he won the most votes in history, regardless of race or political party.

If you compare Obama's situation to John Kerry's four years ago, you can see in this shift that most states are bluer and more Democratic, even Obama-dropped states like the West, pretty much every state in the South and Northeast.

It's blue, here and there, with a few exceptions.

One exception is Massachusetts.

It's the home of John Kerry.

It wouldn't surprise me if Obama is down

And in McCain's home state of Arizona, Obama didn't get more votes.

On the other hand, located in the center of this country

Arkansas, Tennessee, Oklahoma, and West Virginia were no good either.

Bill Clinton in '96 was the last time the Democrats won, but it's in this very region that you see the really big difference, the highlands like Appalachia and the Ozarks.

Sure, Clinton was from Arkansas, but it's a big change.

When you think of a region like Arkansas

There's a book called "What's going on in Kansas?"

Obama is doing relatively well in Kansas

We lost, but Democrats always lose here.

I didn't lose as badly as others.

What's going on in Arkansas anyway?

(Laughter) There's a negative image of Arkansas.

A large number of so-called "hard-headed Southerners" with guns

I can imagine they wouldn't vote for someone named Barack Obama or something who looked like this.

It's a race issue. Is this a fair view?

Is it prejudice against people around Arkansas?

It's at least partially fair

And the only way I know that race is definitely a factor is because I asked them.

I didn't ask it directly, but in 37 of the 50 states, the exit polls asked me a direct question about race.

I asked this question

“Was the candidate's race a factor in deciding who to vote for in today's presidential election?”

How many of you answered, "Yes, race was not only a factor, but it was an important factor in my decision," and how many of you ended up voting for McCain, perhaps in combination with other factors, or perhaps because of this factor itself?

How common was that behavior among white voters or among non-black voters?

As you can see, the results vary greatly by region.

In Louisiana, about one in five white voters said, "Yes, the big reason I didn't vote for Obama was because I'm African-American."

If even half of those people had voted for Obama, he would have easily won in Louisiana.

That goes for all the top states on this list.

On the other hand, people in California and New York would say, "We're being enlightened," but there's certainly a lot less voting based on race.

Here's a map of the same data

In this chart, shown in red, are the states where most people said, "Obama's race was a problem for me."

There are similarities between the map compared to 1996 and this map.

This seems to explain exactly why Obama did so badly in the region.

we should ask

Can racism be predicted in any way?

Is there anything that causes racism?

Is it just an Arkansas or Kentucky peculiarity that we don't understand?

Or are there structural factors at work?

There are many other variables you can look at

Factors such as income, religion, and education that economists and political scientists have routinely observed

Is it what caused the manifestation of racism in this national experiment that we did on November 4th?

In fact, there are two factors that are strongly correlated that allow us to make predictions. Education is one of them. The states with the lowest number of years of schooling per adult are highlighted in red.

Here you can see the connection with racist voting trends.

Another important variable is the type of neighbors.

Even rural states like New Hampshire and Maine are seeing racist votes against Obama.

So it's a combination of those two factors: education and neighborhood type, which I'll talk about in a moment.

The problem with states like Arkansas and Tennessee is that they're very rural and poorly educated.

That's why racism is predictable

There are probably other factors, but this seems to foreshadow racism.

Let's dig a little deeper into this "comprehensive social survey."

This is done every other year by the University of Chicago.

they're asking a really interesting set of questions

In 2000, there's a particularly interesting question about racist opinions.

An example would be "Does anyone live in your neighborhood who are of a different race than you?"

You can see that the results vary greatly depending on the type of community

About 80% of people in urban areas say they have a neighbor of another race, but only 30% in rural communities.

Maybe it's just that you don't have many neighbors if you live on a farm

But in any case, I don't have many interactions with people who are different from me.

So let's take a sample of the white population from this survey and divide it into those who have black or other racial neighbors and those who have only white neighbors.

I don't see a big difference when it comes to political opinion.

This was eight years ago, and there were a lot of Republican-leaning people at the time.

But whether you're Democrat or Republican doesn't really matter what your neighbors are like.

And even questions about race, like the issue of racial policy, such as minority preferential treatment, aren't much different here.

Minority incentives have in common that they are unpopular with white voters.

There's absolutely no difference in how people with black neighbors feel about this issue compared to people without black neighbors.

But if you ask a little more deeply personal question, "Should interracial marriage be legal?"

In this case we see a big difference

People who don't have interracial neighbors are nearly twice as likely to disapprove of interracial marriage than those who do.

it just depends on the neighbors who live around you

In the 1996 version, not the 2000 version, the same survey asked, "Would a black person vote for a good presidential candidate?"

People who don't have African-American neighbors are more likely to say, "That's a problem for me."

So this isn't about city or country

it's about who lives around

Racism is predictable, and it can be foreseen by the presence or absence of interracial interactions.

So if we want to tackle this problem, we should aim to promote interracial exchange.

I have some pretty obvious ideas for doing that.

i love the city

Especially if the city is sustainable, diverse, and able to support different ethnic and income groups.

I think the city encourages more connections and casual interactions on a daily basis than the countryside.

But not everyone wants to live in a city like New York.

So what you have to think about is things like the road network.

This is the streetscape of East Lansing, Michigan, where I grew up.

A traditional Midwestern countryside with a grid of roads.

There are real neighborhoods, trees, and roads you can walk on.

And you end up interacting with people you like and people you don't know in your neighborhood.

As a result, it's become a very tolerant community, and I think it's different from places like this in Schaumburg, Illinois, crammed with cul-de-sacs and drive-thru Starbucks like this.

I think there's a connection between the prevalence of this type of urban planning in the 1970s and '80s and the country's conservatism under Reagan.

I have other ideas, such as an exchange program that exchanges students between New York and other countries.

And frankly, within the United States alone, there's enough variation, say, if you take a student from New York University and go to the University of Arkansas for a semester, and vice versa, and do it at the high school level.

In fact, people in schools in Arkansas and Tennessee probably won't have the opportunity to interact positively with people from other states or from other races.

I think part of the educational factor that I mentioned earlier is because of the experience that going to college gives you, mingling with people you wouldn't otherwise interact with.

The point is, this is all good news, because if something is predictable, it's also designable.

I can think of solutions to problems, even if the problem is as vicious and intractable as racism.

If we know the root cause of that behavior and when it happens, we can design a solution to it.

this is all i have to say thank you

(applause)

In 2016, I was asked to write a photo-essay about the water pollution problem in Flint, Michigan.

Flint's water pollution has been going on since 2014.

So I accepted the commission with the idea of ​​photographing three generations of women who face challenges every day.

I was fortunate enough to become good friends with the two women who took me around Flint, artists, activists and poets, Amber Hassan and Shea Cobb.

Shay Cobb, a school bus driver, and her mother, Renee, and their 8-year-old daughter, Zion, were the central characters in the photo-essay.

I followed Shay's school bus route obsessively.

On his off day as a driver, Shay watched Zion study.

I got deep into Shay's private life.

When Shay showed me to Zion's school, there was a warning posted at the water fountain that said, "Don't drink polluted water."

In America, I was shaken from the bottom of my heart when I saw signs that used to be on water fountains saying, "For Whites" and "For Blacks Only," but now read, "Don't drink polluted water."

Should this be allowed?

Flint citizens are forced to drink, cook and bathe in bottled water, while paying the nation's highest water bill for water contaminated with the deadly disease-causing Legionella spp.

Coming to Flint was a natural progression because, coming from Braddock, a suburb of Pittsburgh, Pennsylvania, industrial pollution and contaminated water were all too familiar to me.

"The Notion of Family," our 14-year collaboration, was inspired by the environmental racism we've lived through, the inequalities in healthcare, and the deregulation of chemicals released by U.S. Steel, which led to the highest number of asthma sufferers and infant mortality rates in the United States in Braddock.

In the words of civil rights leader Du Bois, the situation on the river from the Monongahela to the Flint is this: "The city and the whole valley have abandoned this river.

Rivers are used like sewers and ditches to carry waste away.”

General Motors has been blamed for decades for dumping chemicals into the Flint River.

The August 2016 photo-essay, "Flint is Family," was published to let the public know that Flint's water pollution, which is now out of the news, is far from over.

Of course, I knew that my one photo essay was not going to save the residents of Flint, the car town.

Shay is each other's mother and grandmother

And with Amber, I developed a friendship through my battle with lupus erythematosus.

We decided to keep in touch and continue to create.

Co-founded by Shay and Amber in 2017, The Sister Tour is a safe space for Flint-based artists to do their art.

A year later, I had my solo exhibition, "Flint is Family," here at Gavin Brown's Enterprise on West 127th Street in New York City.

As visitors approach the front of the building, they see a nine-meter billboard.

Composed of three giant color negatives, the billboard says, "Water is life," written by The Sister Tour in Nestle water bottles.

Nestlé, the world's largest producer of drinking water, pumps 1,500 liters of water every minute from Lake Michigan's aquifer for almost nothing.

The company also pumps millions of liters of water from the Canadian Aboriginal Reservation, where the inhabitants do not have access to safe water.

This is a fund-raising campaign created by The Sister Tour to raise funds to travel around the country to convey the current state of water pollution.

And to keep the public focused on the problem, we created flags that marked the number of days since the problem was discovered, and put them up in museums around the country.

Last June, I received an email from Amber telling me that the Michigan Attorney General had dropped all charges against eight state and city employees accused of manslaughter and other charges in a Flint water pollution investigation.

I don't think it's time to sit back and wait until the government solves this problem.

Justice Deferred Justice Denied

Five years later, we're still waiting for justice to be brought to all Flint citizens, men and women, young and old.

I asked Amber if there was anything she could do.

She told me about a man she met in Puerto Rico named Moses West, who invented a 13-ton atmospheric water generator.

Amber got Moses to meet with Flint's councilors.

None of the legislators were interested in putting the device into the city to help.

Amber had to bring the equipment herself from a US military base in Texas to Flint.

No Flint citizen could afford to do that.

It was around this time that I decided to send Moses West the combined proceeds from my solo exhibition, "Flint is Family," and a generous grant from the Robert Rauschenberg Foundation.

Last July, Moses West installed an air water generator on a block facing North Saginaw Street between Marengo and Pulaski streets in downtown Flint, and it's still in operation today.

In this area, 4.8 kilometers from the city center, schools are closed, there are no supermarkets with healthy food, and there is no clean water.

Publicly, this area is seen as a rough and poor neighborhood.

But it looks completely different to me

Moses, a police officer, Ranger, and veteran, had a strong vision for this water-relief mission: to provide free, clean water to the people of Flint.

He taught me how to use the device, how to maintain it, and above all, he told me that I could use the device however I wanted.

He told everyone in the city to bring all the containers they had in their homes and store as much water as they could, especially before winter, because you can't extract water at subzero temperatures.

This technology draws in air through a large air filter.

By mechanically condensing, it produces 7,500 liters of water per day.

Residents are free to come to the facility every day from 9am to 8pm and collect as much water as they like, freeing them from long lines for bottled water.

I went to the installation site and interviewed people, "What does Moses and his device mean to this community?"

“What was life like without access to clean water?”

Alita replied, "It is a miracle that God gave Moses the knowledge and skill to give us clean drinking water."

She also told us that before the device was installed, she suffered from severe headaches and was unable to eat due to stomach discomfort from ingesting contaminated water.

Tina said the lead-contaminated water was causing her hair to fall out.

It seems that my head was dizzy and my body was always weak.

After they started using the water from the device, they became stronger and stronger.

David is happy that people in Texas care about him.

When he first drank the water from the device, he said, "This is how God intended water to be."

He fills three 26-liter canisters with water for his own barbecue stall.

With Creativity and Unity Amber Hassan Shea Cobb Tuklo Senegal "The Sister Tour" Myself Flint Citizen Dexter Moon Moses West and the Air Water Generator made it possible to provide 450,000 liters of clean water for free.

(Applause) Flint citizens have a right to clean water.

water is life

Water is the source of life that protects us from disease, death and extinction.

Imagine how many millions of lives could have been saved if Moses' devices had been placed in places like Newark, New Jersey, South Africa, and India, not for profit, but for charity.

The first time Shay and Zion tasted clean water, I put the film in the camera, focused, and put my finger on the shutter button.

When I clicked the shutter, I was overwhelmed with a deep sense of joy and justice.

I sent Shay some photos and she texted me, "Thank you again for bringing light to my city."

He replied immediately and said, "The light has been in you all this time."

It's been four years since I started photographing with Flint, and I've finally captured justice worthy of a good man.

A camera can pull light out of any darkness and turn a negative into a positive.

thank you

(applause)

Like many teachers, every year on the first day of school, I break the ice with my students.

I teach at Lincoln High School in Lincoln, Nebraska, which is one of the oldest and most diverse schools in the state.

And as far as we know, it's the only high school in the world that has Links as its mascot.

it's like a chain

(Laughter) As our mascot, the statue in front of the school building is four rings that are connected like a chain.

Each circle has a meaning

Tradition, Excellence, Unity and Diversity

So on the first day of school, I teach my new students what this circle means, and I give each of them a strip of paper.

Ask them to write about themselves on the paper

It doesn't matter if it's something you love, it's okay if it's what you want, anything that suits you

So I take a stapler and go around the classroom and staple each sheet of paper together to make a chain.

And the chain hangs in the classroom for decoration, of course. It's also a reminder that we are all connected.

we are chains

What if one of these rings is weakened?

And what if that weakened person was the one who was walking around with a stapler?

The person who should be responsible for making this connection.

I am a teacher

As teachers, we work every day to support our students, both socially, emotionally and academically, who come to school from many different and challenging environments.

Like most teachers, some of my students come home every day to spend time around the kitchen table with their parents who prepare healthy, balanced meals.

At dinner time, I'll summarize the story I read that day in Japanese class in Hidaka 1, and explain what Newton's laws of motion are.

But other students go home to homeless shelters and group homes.

Some even go home to the car while their family is just asleep.

Those students come to school with trauma, and when I come home every day, they take that trauma with them.

Look, this is the hard part of teaching.

It's not about grading, or lesson plans, or meetings, which, of course, consume a lot of time and energy.

The harshness of teaching lies in the things you can't do for your children, and once they've left school, you can't change them.

Is there anything I can do about this?

I think back to when I was a student in training at the University of Georgia, in a teaching methods class, I was told that the concept of good teaching had changed.

We're not raising children to be factory line workers.

Students become workers who can communicate with others and work together to solve problems.

So the teacher-student relationship has morphed into something much more powerful than a provider and receiver of knowledge.

The relationship between the teacher and the students quietly sitting side by side is no longer acceptable.

We have to be able to build relationships between students and teachers, and also between students, to help them feel connected to the world they rely on.

I remember my second year as a teacher.

There was a student named David.

That year, I was happy to say that I had done a pretty good job.

I know my job well."

It was the last day of school, and I said to David, "Have a nice summer vacation."

As I watched him walk down the hall, I wondered to myself what his voice sounded like

That's when I realized I wasn't doing very well.

So I changed almost all of my teaching methods.

I created a lot of opportunities for my students to talk to me, as well as for students to talk to each other, reading each other's writings and putting their learnings into words.

And it's precisely through these conversations that I've come to know not only the voices of my students, but also their suffering.

The next year, I was David's homeroom teacher, but his father had been deported because he was an illegal immigrant.

He began to act out his suffering at school, all he wanted was for his family to be together again.

I felt his pain in so many different ways.

I needed someone to listen to me, someone to hold me up so that I could hold him in this situation that I don't even understand.

Occupations where such a need exists include police officers who witness gruesome crime scenes and nurses who lose patients.

But I don't think it's that urgent for teachers.

I have no doubt that the most important thing is to make mental health support easy and affordable for students, teachers, administrators, professional assistants, and all staff for students.

When we work for someone all the time, and that person is usually 25 to 125 students a day, our mental energy is constantly being consumed.

After a while, you may become completely empty and unable to move on.

This is what we call "secondary trauma," or "compassion fatigue," and it means that we absorb the trauma that our students tell us about every day.

After a while, our hearts will be panting under its weight.

The Buffett Institute at the University of Nebraska recently found that most teachers, and more specifically, 86 percent of early childhood teachers, experienced depressive symptoms in the last week.

About 1 in 10 reported levels of depressive symptoms that required treatment.

From what I've heard from colleagues and from my own experience, I feel that this is a common affliction for everyone, no matter what grade they teach.

So what are we missing?

How can I break this chain and fix it?

In the course of my career, I experienced the suicide of two students and one wonderful teacher, who loved children.

When something like this happens, the manual says, "If you want to talk to someone..."

But that's not enough

i am very lucky

I work at a great school under great leadership.

It's a big school district with lots of healthy partnerships with local agencies.

From there, more and more school counselors, therapists and support staff are sent to help the students.

Staff can receive free counseling as part of their benefits.

But in a lot of cases, small school districts, and in some cases, large school districts can't afford it without financial support.

(Exhales) First of all, every school needs interpersonal and emotional support staff, or more precisely, trained professionals who can meet the needs of everyone in the school, not either the needs of the students or the teachers, but both.

Many schools are trying to fill the gaps in support as much as possible, and they're starting to admit that the work we do is very hard.

Another school in Lincoln, School Middle School, has "Wellness Wednesdays."

We invite local yoga teachers to our schools, sponsor lunchtime walks around the neighborhood, and organize social events so that we can all do something together.

Zachary Elementary School in Zachary, Louisiana, has a "midweek meeting," where the teachers have lunch and talk about what's going well and what's bothering them.

These schools create important spaces for dialogue.

Finally, my friend and colleague, Jenn Highstreet, spends five minutes each day writing an uplifting sentence to a colleague telling her that she sees how hard she works and how she treats people with love.

She knows that in those five minutes, she can have an irreplaceable and powerful ripple effect throughout the school.

The chains that hang in my classroom aren't just decorations.

This connection has been hanging above us for four years as students walk down the hallway.

And every year, I have seniors who show up in my 340 classroom, and they remember exactly where their circle is.

I remember what they wrote

I feel connected and supported

they also have hope

Is this what we need?

Someone to reach out and assure me it's okay

Take care, it reminds us that we are connected.

Sometimes we need a little help with a stapler

thank you

(applause)

Do you have pink under your eyes?

This is the remnant of the third eyelid

They are called half-moon folds, and they are most prominent in birds and some mammals, and they act as windshield wipers to keep dust and dirt out of your eyes.

but it doesn't work in humans

It's degenerated and no longer serves its original purpose.

There are several other degenerate structures in the human body, such as the crescent crease.

It degenerated long before Homo sapiens appeared, but it was quietly passed from one species of our ancestors to the next.

So why has it been passed down for so long?

To answer this question, it's helpful to understand natural selection.

Natural selection is the process of passing on to the next generation with a high degree of probability those traits that are favorable for organisms to survive and reproduce in a given environment.

As the environment changes, properties that were once helpful can become harmful.

Such traits are susceptible to selection and eventually disappear from the population.

But as long as the nature doesn't actively cause harm, the uselessness won't be weeded out and will be inherited.

let's see the tailbone

Evolutionary biologists believe that as the climate dried up, grasslands appeared and our tail-bearing ancestors climbed out of the trees and began walking on the ground.

The tail, which helped me climb trees, began to interfere with my ability to walk on the ground.

Thus, ancestors with shorter tails due to mutations were able to successfully live on land and survive long enough to pass their short tails on to future generations.

Perhaps this change occurred gradually over millions of years about 20 million years ago, and the outward tails of our ancestors disappeared.

We now know that the tail disappears as the human fetus grows.

But perhaps because it doesn't do any harm, the short tailbone remains, and it actually serves a minor function as an anchor point for certain other muscles.

About 85 percent of humans have a degenerate muscle called the palmaris longus.

The small band in the middle of the wrist is a tendon attached to a muscle that is no longer functioning.

In this case, we were able to pinpoint the function precisely because there are humans who do not have the palmaris longus muscle.

A degenerate trait remains without an incentive to make it go away, but since there is no incentive to continue possessing it, chance mutations can eliminate that function from part of the population.

If you look at our primate relatives, some of the species that spend more time on the ground don't have palmaris longus, but those that spend more time in trees always have palmaris longus.

It's thought that what was useful for jumping from branch to branch was no longer needed when it came down to the ground.

On the other hand, the cecum may have been part of the intestinal system that our ancestors used to digest plant matter.

Part of the intestinal system may have begun to shrink as the diet changed.

The cecum, unlike other degenerate functions, is not always harmless and can become dangerously inflamed.

In human history, a cecal rupture is equivalent to a death sentence.

So why has it been passed on?

It's possible that they were in the process of a slow selection, and that the mutations that made the caecum smaller didn't occur.

Or maybe it has other benefits, such as a reservoir for bacteria that help digest food.

But in fact, we don't really know why the cecum persists.

Evolution is an imperfect process

Humans are the product of millions of years of trial and error and chance, and we have many evolutionary artifacts that tell the story of our evolutionary history.

Who among the following three people is taking risks?

People who take cholesterol medicine with grapefruit juice

Person going out for a drink after taking acetaminophen for ankle pain

or someone taking an anticoagulant takes aspirin for a headache

Actually everything is dangerous

It can inadvertently cause drug interactions and, in the worst cases, kidney failure, liver damage, and internal bleeding.

A drug interaction is when a drug is combined with another substance to produce an effect that is separate from its intended effect.

Foods, Herbal Supplements, Medicines, and Illicit Drugs All Can Have Drug Interactions

Most drug interactions fall into two categories.

When two substances directly affect each other and when

The effects of one substance on the body when the other substance affects absorption, metabolism, circulation in the body, etc.

For example, anticoagulants and aspirin have similar effects, so taking them together can be dangerous.

Both work by preventing blood from clotting. Anticoagulants prevent the formation of clotting factors that cause blood to clot, while aspirin prevents blood cells from clumping together and forming clots.

Alone, these effects are safe, but when taken together, they can interfere with blood clotting to dangerous levels and cause internal bleeding.

When taken alone, anticoagulants and aspirin are generally harmless, and it is possible for one drug to adversely affect the effectiveness of another, even among individually dangerous drugs.

Cocaine and heroin are both dangerous, and when you mix the two drugs, the danger is compounded, even though their superficial effects seem to cancel each other out.

Cocaine is a stimulant and has many effects, including increasing your heart rate and making your body demand more oxygen.

But heroin is a depressant that slows breathing and reduces the supply of oxygen to the body even though it requires more.

This combination can overwhelm your organs, leading to respiratory failure and death.

Some cholesterol-lowering drugs, statins, interact with grapefruit juice, which is related to drug metabolism.

The liver secretes enzymes, molecules that help break down substances that enter the body.

Enzymes can activate drugs by breaking down complex molecules in drugs into their therapeutic components, or inactivate drugs by breaking down toxic compounds into harmless metabolites.

There are many different types of enzymes, each with binding sites that are compatible with specific molecules.

Grapefruit binds to enzymes that statins should bind to, resulting in a lack of enzymes to break down statins.

What this tells us is that the drug stays in the blood in high concentrations for a long time and can lead to kidney failure.

Alcohol can also alter the effectiveness of enzymes that break down acetaminophen, the pain-relieving ingredient in Tylenol and paracetamol.

When you take acetaminophen, some of it turns into toxic substances.

At the doses applied, this toxic byproduct isn't high enough to cause harm to the body.

But heavy drinking alters the action of enzymes, producing more toxic by-products, and liver damage can occur even at doses that are normally safe.

On the other hand, the herb St. John's wort increases the secretion of certain enzymes in the liver.

What this means is that the drugs that this enzyme breaks down are metabolized rapidly, sometimes too fast to be therapeutically effective.

Although there are a dizzying number of drug interactions, most dangerous interactions are known for commonly used drugs.

New developments in science are helping us understand drug interactions like never before.

Some researchers are developing AI that can use data about the state of proteins in the body to predict side effects before drug interactions occur.

New drugs are being developed all the time, and supercomputers are being used to discover potential drug interactions, even when they're still in development.

February 2013 My wife and I moved to Singapore

Right around that time, Uber announced it was launching a ride-hailing service in Singapore.

Now, my wife and I agree on most things, but we clearly disagree when it comes to using Uber.

I was excited about Uber's technology, because I might never have to own a car again, but my wife felt that Uber would take the jobs of taxi drivers.

Sarah wasn't the only one who felt that way.

As the world's so-called "online marketplaces" like Uber, Airbnb and Amazon start expanding their business, many policy makers like me are concerned about how to deal with the new risks: job losses, low wages, tax evasion.

In addition, business leaders are voicing concerns that the intense competition from global platforms will eat away at local businesses.

Of course I understand the rationale

Ultimately, this is a basic supply and demand economy.

In any market, a dramatic increase in supply should be expected to lower prices, profitability and growth rates for existing business players.

But in my personal experience, I've also seen the opposite trend.

Even online marketplaces, like Gojek in Indonesia or Jumia in Africa, can serve the business ecosystem and the surrounding community.

I've seen good examples where women taxi drivers in Egypt are now able to work without the harassment they've faced in the taxi industry.

We also saw a good example in a village in Kenya, where the economy was booming, because a beautiful lake in a neighborhood that was completely unknown to us is now a national ecotourism destination.

Online marketplaces will continue to grow

And it will transform the way we shop, travel, and transact.

So what we really need to understand is where the truth lies between these two perspectives.

Should we expect more optimistic outcomes, or darker and more pessimistic outcomes?

And is there a way to avoid the negatives and get only the positives?

i believe there is

As a strategic consultant by profession, I study business.

I'm a mathematician at heart, so I find it disgusting when things happen vice versa.

So I went back to basics and posed the question: What is an online marketplace actually doing?

what are they doing

First, at its core, we're doing something very simple.

Matching of sellers and buyers

That's all

Between the driver and the passenger is Uber, Grab in Southeast Asia, DiDi in China.

Merchant-consumer matching includes Amazon, Alibaba and Jumia in Africa

Airbnb for lodging, Kickstarter for fundraising, and more

What all of this has in common is the shift of the basic functionality of matching sellers and buyers from the physical world to the digital world.

That way, you can find better matches faster, and ultimately spread more value to everyone.

Moreover, the biggest advantage of online marketplaces is that they deliver more value for the same amount of effort.

For example, if you're a taxi driver in San Francisco, and you work 10 hours a day, four of those 10 hours you'll actually have a passenger in your car.

If you use the same car on the Uber platform, you'll have an extra hour and a half to pick up passengers.

So the same car is 40 percent more productive.

Other online marketplaces have proven this

The goal is to create more value for the economy in the first place.

Now we need to know who will receive this new value.

We can also give it to drivers, which means more passengers and more income.

If you lower the price, you can benefit the consumer.

Or it's possible for the platform operator to take all the benefits.

Usually these three share the benefits in some way.

Who else?

may be affected even if they are not directly related to this business

If my neighbors decided to rent out their apartments on Airbnb, more people would come around the house, it would be noisier than usual, and I would find the side effects of this productivity magic jarring.

This is what economists call "negative externalities."

This "negative externality" of Uber's increased productivity reduces the value of taxi licenses, for example in New York, by as much as 30 percent.

this is the negative side

This leads to street demonstrations and sometimes even riots.

But I'm sure this can be avoided

As I spent more time in emerging markets, I became more convinced.

In fact, when I was in Singapore, I spent half the week traveling around the country -- Malaysia, Thailand, Indonesia -- and I became more of an online marketplace fan than a user, although it was still unknown at the time.

Some of them made interesting strategic trade-offs that dramatically reduced the secondary "externalities."

Gojek for example

Gojek is basically Uber for motorcycles

It's one of Indonesia's most popular online marketplaces, and the reason for its popularity has a lot to do with the role Gojek chose.

Instead of competing with other transportation options, we chose to gradually integrate them into our platform, like looking up public transit timetables or selecting long-distance buses within the Gojek app.

And you can also book and pay for motorbikes and traditional taxis within the same app.

In a survey of Gojek today, nine out of 10 traditional taxi drivers believe their quality of life has improved since using Gojek's platform.

And 9 out of 10 consumers -- 9 out of 10 consumers -- think Gojek has a positive impact on society at large.

With that much credibility, Gojek has grown to become the great online marketplace it is today, selling everything from groceries and household items to massages and dry cleaning home delivery.

It's all the result of careful trade-offs. We wanted to be in a position to bring together a larger ecosystem where other people had a role to play. We wanted to avoid ending up with a monopoly profit that turned out to be a small part of a larger market.

Jumia is another interesting case.

Jumia is Africa's Amazon

But Jumia doesn't bring Amazon's anxiety to the local small business world.

One of the reasons is that Jumia is committed to actively investing in local entrepreneurs to grow them into the digital age.

And let's not forget, Jumia is used in countries with the lowest levels of digital literacy and online access.

Jumia could have aimed to reform these issues through general lobbying, and perhaps they're doing that too, but they've established Jumia University, which provides e-learning on a platform, enabling merchants to learn basic digital and business skills.

We surveyed online marketplaces in Africa last year.

During my research, I met one of the merchants studying at Jumia.

his name is jomo

I got fired from my job in 2014, and that's when I decided that I wanted to be my own boss.

I also wanted to be independent

I didn't want to be fired again.

But at the time, Jomo didn't even know the letter "bi" in business.

So he had to go through a series of trainings to learn how to choose and price products, and how to promote them online.

Jomo now has an online business with 10 employees.

And a few months ago, we just opened our first physical store outside of Nairobi.

Now, through this university, Jumia has the potential to support many talents like Jomo.

And together with other online marketplaces in Africa, we can assume that by 2025, we can create as many as three million jobs.

Jobs will be created directly or through the wider community.

And sometimes the success or failure of a platform depends on whether or not it considers its far-reaching implications.

For clarification, let's go back to Singapore.

When my wife and I decided to leave Singapore last year, so did Uber.

It's the same timing again.

As a matter of fact, Uber has lost the ride-hailing race to Malaysia's Grab.

Now, interestingly enough, my wife wasn't too worried about Grab, because Grab was originally a different name.

It was called MyTeksi, and as the name suggests, it started as a platform for taxis.

So when Grab started expanding driver registrations beyond taxis, it was seen as a gradual and natural move.

And Grab was very careful

Think about what kind of safety net (social safety net) you want to provide to all drivers.

We even introduced special insurance packages and financial education programs.

By contrast, taxi drivers in London, New York and Paris felt that the platforms didn't understand that their licenses cost them 200,000 euros and they were often paying off loans.

If you don't take into account this kind of information about the social environment, you're going to get a lot of backlash.

I'm not claiming that the trade-offs with Grab, Jumia, and Gojek are without risk.

Did their growth slow down temporarily at some point?

probably so

but look at their current situation

Gojek is valued at $10 billion

Jumia is one of only three unicorn companies in all of Africa.

Grab kicked out Uber across Southeast Asia

And I don't think these tradeoffs are unique to emerging markets.

Amazon, Uber, and others can learn from them and apply them to the realities they face.

It doesn't have to be a zero-sum game in the long run.

In the long run, maybe this is what my Asian side says, patience pays off.

There's value in rethinking goals and priorities, and trying to fit them into the larger equation, one that includes not only operators and users, but also regulators, policy makers and communities.

And most of all, it includes the industry itself that you're trying to break into.

thank you

(applause)

I'm going to tell you about our success in Africa.

A year and a half ago, four of the five full-time members of Ushihidi, the Swahili word for oath, were TED Fellows.

A year ago there was violence in Kenya after elections

At that time, in three days, we had completed a prototype of a system that would allow anyone with a mobile phone to send information about what was happening around them.

We started from there with what we know in Africa, the devices we all have, the mobile phone, as a common ground.

``Police fired live ammunition and tear gas at demonstrators...'' reports come in.

This is two of the articles from January 17th last year.

Our system was immature and very basic.

A mashup that took data from people and put them on the map.

But then I thought there was more to do

We used what we had developed so far, and based on that, we created a platform that can be used anywhere in the world.

This is the development team, made up of people from Ghana, Malawi, Kenya, and other parts of Africa.

Some are from America

We are developing something that can be used on smartphones not only for developing countries, but also for developed countries.

i think this is correct i.e.

If it works in Africa, it works everywhere

So develop it in Africa and bring it to the forefront

Now used in the Democratic Republic of the Congo

It's also being used by NGOs all over Africa, each with a small project.

Just last month, Al Jazeera in Gaza started using it.

But I didn't come here to talk about this.

I want to talk about the next big thing, which is that we now have the ability to report factual testimonials on the ground in real time.

I witnessed this in a recent incident in Mumbai, where it's much easier to report than to consume.

What do you do when you have too much information?

Here's a Twitter report written over the course of three days about Mumbai.

How do you decide what is important?

How accurate is what you are reading?

So what we've found is that there's a lot of crisis information that's wasted, because there's just too much information to actually do anything right now.

We really only care about the first three hours.

we're looking at the first three hours

How do you deal with the influx of information?

i don't know what's really going on

Locally and around the world, people are still curious and want to know what's going on, but they don't know.

So what we at Ushihidi did was to crowdsource this information.

Take a look at this Twitter, it's information overload

I'm getting a lot of information, that's good

But then?

So I thought I could do something interesting here

We have a small team to deal with this

We think we can create a crowdsourced filter.

use the cloud to apply information

We rank information and we give information We rank each person and we get more accurate and weighted information

So we have a better understanding of the probability of whether something is true or not.

It's interesting that innovation like this is coming from Africa, frankly.

Comes from a place you never thought possible

young and talented developers

The community around it decided to make this

so thank you very much

Happy to be part of the TED family

(applause)

Most of us use technology in our daily lives.

Some people rely too much on technology to do their jobs.

For a long time, I saw machines, and the technology that powers them, as the best tools to make work more efficient and productive.

But as more and more industries have become more automated, I've been wondering: What happens to human skill when machines can do jobs that were previously done by humans?

How does our desire for perfection, precision and automation affect creativity?

As an artist and researcher, my job is to study AI and robotics to create new processes that enhance human creativity.

For the last few years, I've been working with machines and data and new technologies.

It's part of my lifelong interest in the dynamics of individuals and systems, and all the mess they contain.

It's a way to explore the question of where the boundaries between AI and humans lie, and it's a place to develop ways to explore the possibilities of sensory combinations in the future.

I think it's a place where philosophy and technology intersect.

I have learned from this job

that embracing our imperfections reveals something about ourselves

that the study of art can facilitate the creation of the technology that shapes us

Combining AI and robotics with existing forms of creativity -- in my case, the visual arts -- helps us think more deeply about what it means to be human and what it means to be a machine.

And through my research, I've discovered that as machines and humans progress, collaboration is important to create space for both.

It all started with a simple experiment The machine used was the "Drawing Operations Unit: Generation 1"

It was abbreviated "D.O.U.G."

Before making D.O.U.G., I didn't know how to make a robot.

I took an open-source robotic arm design and put together a system that follows my movements in real time.

The premise was simple: the machine imitates what I do.

If I draw a line, I will imitate the line

Here's a video of my first painting in front of a small audience in New York in 2015.

It was a sparse performance, no lights, no music, no obstructions for the audience.

My hands were sweaty and the robot's servo motors overheated.

(Laughter) Clearly, this is not the situation for us.

But something unexpected and interesting happened

Look at the early D.O.U.G.

The on-screen simulation didn't have a single pixel error, but in the real world, it didn't.

It slipped, slipped, cut off, and shook, so I had to deal with it.

There was no original figure there

And yet, for some reason, an error made it an interesting piece.

The machine was interpreting my lines, but it wasn't perfect.

I was forced to deal with

We were adapting to each other in real time.

I found out by watching this

Mistakes make the work more interesting.

Through the imperfections of the robot, the imperfections of both are transformed into the beauty of interaction.

I was thrilled to realize that perhaps part of the beauty of human and machine systems lies in their common fallibility.

In the second generation of D.O.U.G., I wanted to explore this idea.

I just wanted to design a system that would react unpredictably to my drawing, rather than just push the robot arm to its limits and be accidental.

So I used visual algorithms to extract visual information from both my digital and analog paintings over the last few decades.

We then train a neural network on that picture to generate patterns that repeat in the artwork, and then feed it into the robot with special software.

I've collected as many drawings as I could find -- finished pieces, unfinished prototypes, random sketches -- and tagged them for the AI ​​system.

I'm an artist, and I've been creating for over 20 years.

It took me months to collect that much, and I could see the big picture.

It takes a lot of work to train an AI system.

A lot of work goes on behind the scenes

But in doing this work, I've learned how AI is built.

It's not just made up of models and classifiers for neural networks.

It's a system that's adaptable, configurable, and always in the hands of humans.

It's a far cry from the AI ​​we've been led to believe is omnipotent.

So I collected pictures for neural nets.

And I realized that before that, it was impossible.

My robot, D.O.U.G., now reflects my life's work interactively in real time.

The data is personal, but the results are very powerful.

I was very excited, because I started to think that machines don't have to be just tools, they can act as non-human collaborators.

And more than that, I thought that the future of creativity might lie not in what we made, but in how we collaborated to explore new ways of making things.

So if D.O.U.G.\_1 is the muscle D.O.U.G.\_2 is the brain, I would like to think of D.O.U.G.\_3 as the family.

I wanted to explore the idea of ​​large-scale collaboration between people and things.

Over the last few months, I've worked with a team to develop 20 robots that can work with me as a community.

The robots worked collectively and worked with us all over New York.

Inspired by the Stanford researcher Feifei Li, who said, "If you want to teach a machine to think, you first have to teach it to see."

And so, in doing so, I tried to reimagine my life in New York over the past decade and how it was viewed by surveillance cameras all over the city.

And I thought it would be interesting to use those images to teach robots how to see.

So in this project, we started thinking about the line of sight from the machine, and thinking of vision as a scene from somewhere else, coming from different directions.

We've collected live camera footage that's publicly available on the Internet, people walking on the sidewalks, cars and taxis in the driveway, all kinds of movement in the city.

Based on this image, we applied a technique called optical flow to train a visual algorithm to analyze the movement of the city in terms of its overall density, direction, state of rest and speed.

The system extracted those states from the images as positional data and turned them into sketchbooks for the robot to draw.

It's not one-to-one collaboration, it's many-to-many collaboration.

By combining human vision with urban machinery, we've reimagined the possibilities of landscape painting.

No experiment with D.O.U.G. will be the same.

And through collaboration, humans and robots can create things that neither one can do alone. Humans and objects are working side by side to explore the limits of our creativity.

i think this is just the beginning

This year, I launched Scilicet, a new laboratory that explores human and human collaboration.

I'm interested in the feedback loops between individuals, artifacts and ecosystems.

We're trying to combine outputs from people and machines with biometrics and other environmental data.

We invite anyone who is interested in the future of work, systems, and people working together to work together.

Everyone has a role, not just the technicians who have been entrusted with this task.

I believe that by teaching machines how to do things that have traditionally been 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 the imperfections and recognizing the fallibility of both humans and machines, and thereby expanding the possibilities of both.

Right now, I'm in the middle of discovering the creative wonders of humans and things.

I have no idea what that might look like in the future, but I'm very interested in finding out.

thank you

(applause)

let me read some of my strips

Most of these have been selected from monthly publications in an architectural design magazine called Metropolis.

The very first is a "defective switch"

Another nicely designed new building ruined by the clunk of a mundane wall switch

Great during the day when the sunlight floods the main room

But when the sun goes down, everything changes

Architects spent hundreds of hours designing shiny brass switchplates for a new office tower.

Then I had a contractor install a 79-cent switch behind it.

When I step into a dark room, I unconsciously explore the walls

reflexively raise a small plastic knob

But as the room bathes in the false glow of late-evening light, the sounds that greet us remind us of the filthy men's restrooms behind Greek coffee shops.

(laughter) This sound makes the first impression in any room, there's nothing you can do about it

But where does this commonly described snap sound come from?

Is it simply a by-product of rough mechanical action?

Or is it an imitation of half the sounds we make when we're disappointed?

Dental sounds of languages ​​not belonging to Indo-European languages ​​that we often hear?

Or the exaggerated sound of the synapses in the cockroach's brain being excited?

In the 1950s, mercury switches and quiet control knobs were used to eliminate this sound as much as possible.

But today such improvement somehow feels unreal

The snap is the modern triumphant clarion that heralds our arrival every time we enter an unlit room.

The sound you make when you flip a wall switch to turn it off is essentially completely different.

has a deep, melancholy sound

children don't like

That's why children leave the lights on all over the house Adults find peace of mind

But wouldn't it be easy to craft a switch on the wall so that you could hear the discreet whistle of a steamship?

A recorded chicken crowing?

The sound of distant thunder?

After trying thousands of unlikely substances, Thomas Edison finally found a suitable material for the filament of a light bulb.

So why didn't he pay attention to the sound of the switch?

this story is over

(Applause) The next story is "The Taxpayer's Hymn."

It is congratulations that so many taxpayers, mirrors of their citizens, survived the rapid growth of more commercial buildings.

This one- or two-story building was designed to generate income just enough to cover the taxes on the land it stands on, and it wasn't built to be a permanent building.

But somehow, it's disrupted the efforts of real estate developers who want to build skyscrapers.

Although it does not claim architectural beauty, its ideal transience suggests that it is a wonderful stand-in for the large-scale structures that will take its place in the future.

A perfect example sits in a corner

It's like a comfortable respite in the high-density buildings that surround it.

Breaks between light and air Buildings as waiting time

Obscured by billboards These buildings often take some time to be recognized as specially constructed modern taxpayers unlike their neighbors Small commercial buildings built early in the century Sealed upper floors Ground floor spaces now serve taxpayers

The little surface not covered by the sign is usually encased in dark greenish gray streaked aluminum paneling.

Take-out sandwich shop Photo developing reception Peep show and tie shop

However, there are times when this temporary building has stood for almost a lifetime.

The ephemeral building is a feat of modern industrial organization, a healthy idealization of the urge to build, and a proof that all architectural ideas need not be immutable.

end

(Laughter) The next story is "On a Man's Lap."

For the ancient Egyptians, the lap was a platform on which the deceased's earthly possessions lay, measuring about 30 feet from sole to knee.

It wasn't until the 14th century that an Italian painter realized that the lap was a Greek temple wrapped in flesh and cloth.

For more than 200 years, the infant Christ has been depicted sitting on the lap of the Virgin Mary, standing up, and then sitting down again.

Every child repeats this action, straddling one or both legs, sitting sideways, leaning against the mother's body.

From those days to the modern ventriloquist doll, it was but a moment in history.

"You were late for school again this morning, weren't you?"

The ventriloquist must first convince us that the person sitting in his lap is a little boy.

The illusion of chatter just happens along with it

"Jimmy, if you have an excuse, why don't you tell me?"

As an adult, I can admire those knees from a nostalgic distance

Memories of the ephemeral temple on my knees, built every time an adult sits, fading

On a crowded bus, someone always let me sit on your lap

Children and teenage girls are most aware of its structural aesthetics.

I understand the structural integrity of my uncle's deep and loving knee compared to the wobbly position of my nervous niece in high heels.

The relationship between knee and knee owner is direct and intimate.

I imagine a 36-story, 450-unit condominium that would give any architect a reason to consider their mental health status before committing to a major design assignment.

Of course, there are no windows in the bathroom or kitchen.

An environment without any inconvenience is the building of childhood What you look for when you become an adult What you can't find

That's all

(laughter) The next story is "Harbor Peace Collection." A nondescript warehouse, briefly visible from the northbound Plixko Expressway, is a resting place for the European dried fruits of the Harbor Peace Collection.

Deep wrinkles on the surface of dried cherries

The eerie luster of an oversized date palm

Do you remember wandering among the store shelves as a kid?

Display of cockroach-proof jars with shabby labels

Dried pears like genitalia

Apricot split in half that looks like a cherub's ear

The leftovers were purchased in 1962 by a wealthy prune juice maker named Maurice Haberpeace and put together as a collection.

As an art form, it's somewhere between still life and plumbing.

When he died in 1967, a quarter was sold as compote to a luxury hotel.

(laughter) Unsuspecting hotel guests were served Turkish figs for breakfast more than 50 years ago.

(Laughter) The rest of the collection is still here, so we can build a permanent museum and research center, and it's stored in a brown paper bag until the building costs are collected.

Shoes made of apricot leather for a Russian Tsar Princess

thank you so much

(applause)

Norse gods lived in the wonderland of Asgard

Odin's majestic palace, Valhalla, towered above the mountains and was linked by Bifrest, the rainbow bridge.

Their world was wonderful, but it towered defenseless against the giants and fairy trolls of Jotunheim, who underestimated the gods and wanted to destroy them.

One day, while the mighty god Thor was fighting his enemies in a foreign land, a stranger appeared on a mighty gray horse.

The visitor made an amazing proposal

He's going to build the most spectacular wall you've ever seen, a wall so high no giant can climb it, so strong no troll can break it.

In return, he demanded a marriage to the beautiful goddess Freya and the sun and moon in the sky.

The gods disapproved of this request and tried to drive him away.

But Loki, who is also a charlatan, has devised a devious plan.

He said the gods should accept the stranger's offer and present such harsh conditions that the wall cannot be completed in time.

He said he had nothing to lose and could build most of the wall for free.

Freyja didn't like the idea at all, but Oden and the other gods were persuaded, and the carpenter made a deal.

We only had one winter to complete the walls.

If even one part is unfinished by the first day of summer, he will not be paid.

And I didn't have to get help from others.

The gods made a covenant under oath, making the stonemasons swear not to harm Asgard.

In the morning, the stranger began digging the foundation with astonishing speed, and in the evening he headed up the mountain to fetch the stone.

But when the gods saw him returning the next morning, they began to worry.

No one was there to help the masonry, as per the contract.

But his horse, Svadirfari, was dragging so much stone that it left a deep ditch in the ground.

winter has passed

The stranger continued to build, Svadirfari continued to pull, Snow and rain did not slow their progress.

There were only three days left until summer, but the walls stood tall and strong, and the gates were finished.

The gods were appalled, realizing that not only would they lose the fertility goddess forever, but that without the sun and moon the world would be forever in darkness.

As they wondered why they made such a ridiculous wager, they remembered Loki and his terrible advice.

Loki suddenly realized how stupid he was

The gods threatened Loki with an unimaginably painful death if he didn't find a way to avoid paying the carpenter's price.

Loki then promised to sort things out and ran away.

Outside, it was late at night, and the carpenter was preparing to leave to collect the last stone.

When I was about to summon Svadirfari, a mare emerged from the field.

Svadirfari was so beautiful that she ignored her owner, and she let go of the reins and ran away.

The mason tried to catch her, but as the mare ran deeper into the forest, Svadirfari followed her.

the stranger was furious

Knowing that the gods were behind the mastermind, he boldly confronted them.He was no longer a mild-mannered stonemason, but a fearsome mountain giant in his true form.

this was a terrible act

Thor had just returned to Asgard, and the gods ignored the oath when they learned it was the work of giants.

The only payment the carpenter received, and the last thing he saw, was a powerful hammer swing from Thor's Mjolnir.

When the last stone was laid on the wall, the gods celebrated their victory.

But Loki wasn't among them.

When Loki finally returned several months later, he had a beautiful eight-legged gray foal with him.

The foal grew into a magnificent horse called Sleipnir, which Odin rode and overtook the wind.

But Loki didn't want to talk about where he came from.

i have had a lot of success

Over a decade ago, right out of college, I started a company with my friend Scott.

I had no business experience, no big plans, and when I started, the idea was that I wouldn't have to get a job -- (Laughter) because I didn't want to wear a suit to work every day.

that point went well

(Laughter) Now, we have thousands of amazing employees and millions of people around the globe using our software.

It's even being used extraterrestrially, and it's on its way to Mars right now.

So when it comes to work, you'd think I knew what I was doing.

I confess, I still often feel like I don't know what I'm doing.

I've felt that way for 15 years, and I've learned that this feeling is called "impostor syndrome."

Don't you ever feel like you're inadequate and fake? It's just that I've deceived myself with intuition and guesswork (laughs).

I've felt that way a lot

I was interviewing for my first HR director, and I was like, 'I've never worked for a company that has an HR department.'

When I'm in a suit-filled boardroom in my T-shirt and hearing the abbreviations flying around, I feel like I'm a five-year-old, and I'm secretly taking notes so I can look them up on Wikipedia when I get home.

(Laughter) When I was just starting out, someone would call me and ask me for my account, and I would be like, "Are you asking me to give you money? Are you saying you'll give me money?"

(Laughter) So I put the phone down and said, "Scott, you're the cashier," and I handed him the phone.

(Laughter) At the time, we were both doing different jobs.

For me, imposter syndrome is the feeling that you're stuck in a corner and you can't escape from it.

I know in my heart that I don't have the skills and experience to be there, but I'm already there and I need to do something about it.

It's not the same as fear of failure or failure.

It's the feeling that you're going to get through it somehow, and the fear that someone will find out.

And if it's found out, that's what I feel

(Laughter) My favorite author, Neil Gaiman, summed it up beautifully in his speech to college graduates about "making great art."

I will read it so as not to make a mistake

"I heard a knock on the door and there was this guy standing there with a clipboard, and I thought he was going to tell me that he'd found out and it was over. I had to get a job."

When I hear a knock on the door, I still feel like the man in black with the clipboard is telling me time's up.

I'm a bad cook, so I'm relieved to know it's the kid's pizza delivery guy.

(Laughter) I just want to say that this isn't necessarily a bad thing.

There is also a positive side to this feeling.

I'm not trying to give a motivational talk like, "Let's get started."

It's about looking back at my own experience with imposter syndrome and how I've tamed it and turned it into a force for good.

A good example of this is my early experience at Atlassian.

Four years after its founding, it had about 70 employees.

So I followed the auditor's advice -- and many good stories start with the auditor's advice -- (Laughter) and applied for New South Wales Entrepreneur of the Year.

Surprised to win in Young Entrepreneurs Under 40 Surprised to win in Young Entrepreneurs Under 40

there were eight departments

It was all the more surprising because I didn't even want to go to the awards ceremony when I saw the names of my potential competitors.

So Scott went to pick up his medal.

Then there was the national award ceremony.

I thought I should attend this time.

So I borrowed a suit, invited a girl I'd just met -- I'll talk about her later -- (Laughter) and went to a big, formal ceremony.

Surprise turned to shock when I won the first prize of the evening, the Young Entrepreneurs category, beating out representatives from other states to win Australia's Young Entrepreneurs of the Year.

When I woke up from the shock, lots of champagne came out and the party started and I thought it was over

enjoyed it very much

At the final awards of the night, our shock was everyone's shock when we beat out everyone else in the other categories to win "Australian Entrepreneur of the Year."

Everyone was so surprised that when the presenter, Ernst & Young CEO, opened the envelope, the first thing he said was, "Really?"

(Laughter) Then I picked myself up and announced our award.

(Laughter) I knew very well that it was beyond me.

And then the water got deeper, and I was going to represent Australia at the Global Entrepreneur of the Year in Monte Carlo, competing against 40 other countries.

In my newly borrowed suit, I met a lovely man named Vermiro de Azevedo from Portugal for dinner.

absolutely amazing person

A 65-year-old man who has been running a company for 40 years

has 30,000 employees

At that time, we had 70 employees.

4 billion euros in sales

After a couple of glasses of wine, I confessed that I didn't feel like I should be here, that I was way over my head and that someone would find out and send me back to Australia.

He looked at me for a moment and then said that he felt exactly the same way, and that I think all the winners felt that way, and that he didn't know anything about Scott or me or the technology, but he knew he was doing something right, so just keep doing it.

(Laughter) This was a big realization moment for me.

One is that I know other people feel the same way.

The other thing is that I've learned that no matter how successful you are, that feeling doesn't go away.

I thought successful people didn't feel fake, but it turned out to be the opposite.

This is not something you feel only at work

Happens in my personal life

In the early days, I was traveling between Australia and San Francisco every week for Atlassian, and I accumulated enough points to enter the Qantas business lounge.

There is no place less like me

(Laughter) You can see me in jeans and shorts and a T-shirt and say, "What's going on? How did you get lost?"

But things in life happen when you least expect it.

One morning, more than a decade ago, I was there on a weekly business trip when a beautiful woman from another world walked straight through the lounge toward me, thinking she was someone else.

Because of the mistaken identity, I am a genuine fake at this time.

(Laughter) Instead of freezing up like I always do and pointing out my misunderstandings like a gentleman, I just kept the conversation going.

(Laughter) The stereotypical Australian fakery took a turn for the better and ended up exchanging phone numbers.

Two months later, I took her to an awards ceremony.

Now, more than 10 years later, I am very happy that she is my wife and has four wonderful children.

(Applause) I feel like every morning when I wake up and roll over and look at my wife, she'll say, "Who are you? Who gave you permission to be in this bed? Get out!"

I suspect my wife feels the same way sometimes.

And this is why we have such a good marriage.

While doing my research for this talk, I learned that one of the hallmarks of successful marriages is that both parties feel inadequate.

I think the other person is much more attractive than I am

i feel like i'm fake

If you don't get stuck there, you can build a good relationship by being grateful and trying to be a good partner.

That's why even if you remember that feeling, don't freeze.

Somehow keep the conversation going, even if the other person misunderstands

It's common to feel like you're different from who you really are, or to be prejudiced by people.

As a more recent example, a couple of months ago I was staying up late with my kids and saw on Twitter that Tesla was saying that its large industrial battery could solve the power crisis in South Australia.

I challenged them by tweeting mindlessly to see if they were serious.

So I kicked a small stone on top of a big hill and got caught in a self-induced avalanche.

A few hours later, Elon tweeted back that he was serious, saying that within 100 days of signing the contract, he could build a 100 megawatt-hour facility, the largest battery in the world.

Then it got crazy

In less than 24 hours, all major media outlets have reached out via messages and emails, asking for input from "energy experts."

(Laughter) At the time, I didn't even know the difference between a 1.5-volt AA battery for a child's toy and a 100-megawatt-hour industrial battery made in South Australia that could solve the power crisis.

I felt like my impostor syndrome had become chronic. (Laughter) It started getting really weird.

I remember thinking, "Damn, I started doing something weird and I'm stuck.

Throwing it out here could slow down the adoption of renewable energy in Australia, and I might look like a total idiot, just saying something weird on Twitter."

I thought the only way I could go was to learn without getting stuck.

So I spent a week trying to learn as much as I could about large industrial batteries, the grid, renewable energy, the economics involved, and whether it was even possible.

I spoke with the chief scientist and several ministers of the Federal Institute for Scientific and Industrial Research to hear what each side had to say.

I also interacted with the Prime Minister on Twitter.

I was even able to look like an expert on the evening news program.

(Laughter) But as a result, South Australia put out a bid for storage batteries, and more than 90 bidders.

And in the space of a few months, the domestic debate has moved from coal-to-coal and high-profile pro-fossil-fuel calls in Congress to what is the best type of battery for building large-scale renewable batteries.

By that point in my life, I was well aware that I was fake.

I knew I was in the depths where I couldn't stand

But instead of getting stuck in it, I learned as much as I could and tried to use my fear of looking stupid as my motivation and turn it into a positive force.

We all think successful people don't feel like fakes.

I've met a lot of entrepreneurs, and I've learned that it's actually the opposite.

But instead of questioning themselves, the most successful people are constantly asking themselves whether their ideas and knowledge are correct.

Don't be afraid to ask for advice when the water is too deep

I don't think it's disrespectful

I use that advice to hone my ideas and learn.

It's okay to be in a place where you can't stand at times

I am often

that's fine

Even if you're in a situation where you can't press the escape button, don't freeze up, take advantage of the situation, don't become paralyzed, and try to turn it into a positive force.

It's important to take advantage of this, and this isn't some silly popular psychology about overcoming imposter syndrome.

It's about the importance of self-awareness

In fact, I'm very aware of how fake it feels right now. I'm kind of a pseudo-expert, talking about feelings I didn't even know the name of when I accepted the talk a few months ago.

that would be the best example

(laughs) Thank you.

(applause)

The first half of the 20th century was an absolutely terrible time for human life, a cataclysm.

World War I had the Great Depression, World War II, and the rise of communism.

And through these things the world was torn apart, torn apart and divided.

Walls were built, political walls, trade walls, movement walls, communication walls, iron curtains that divided people and nations.

It wasn't until the second half of the 20th century that we slowly bounced back from this rock bottom.

the wall of trade has crumbled down

This is the tariff data, and it's gone from 40 percent down to less than 5 percent.

We're globalizing the world. What does that mean?

So we've extended cooperation beyond national borders, and the world has become more collaborative.

The wall of movement has crumbled down

In 1950, a typical flagship carried between 5,000 and 10,000 tons of goods.

Today's container ships can carry 150,000 tons, have fewer crews, and can be unloaded faster than ever before.

Communication barriers, of course, have been brought down by the Internet.

And of course the Iron Curtain and the political walls came down.

great for the world

trade expanded

this is a little bit of data

In 1990, China's exports to the United States were worth $15 billion.

In 2007 it was $300 billion.

And most notably, at the beginning of the 21st century, for the first time in modern history, we saw growth in most parts of the world.

As already mentioned, China has been growing at an annual rate of 10% since around 1978, after the death of Mao Zedong.

every year it's amazing

Never in the history of mankind have so many people been lifted out of abject poverty.

Over the past 30 years, China has become the world's largest poverty escape program

India is a little behind, and has grown tremendously since 1990.

My income back then was less than a thousand dollars a year.

nearly tripled in 18 years

Six percent annual growth, which is absolutely amazing.

Now Africa, Sub-Saharan Africa Sub-Saharan Africa has been the slowest growing region in the world.

From the beginning of the graph, you can get a glimpse of the African tragedy.

It was negative growth.

People became poorer than their parents, and sometimes their grandparents.

But at the end of the 20th century, at the beginning of the 21st century, Africa started to grow.

There's reason to be optimistic, things are about to get better.

why

In today's cutting-edge fields, new ideas drive growth.

That is, products that require high R&D expenditures and are inexpensive to manufacture.

Ideas like this are driving more cutting-edge growth than ever before.

Ideas have amazing properties

I think Thomas Jefferson puts this very well.

He said, "Those who receive ideas from me gain insight without cutting my ideas.

May those who light from my candle get fire without darkening my candle."

To put it a little differently, one apple can feed one person, but one idea can feed the world.

It's not new, it's not really new to TEDSter

Because this is the TED model.

What's new is that ideas are starting to generate growth like never before.

Perhaps this is why trade and globalization are more important and powerful than ever, accelerating growth like never before.

Before explaining that, I would like to ask you a question.

Let's say we have two diseases, one is rare and the other is common, but both are equally serious if left untreated.

If you had to choose, which would you choose? Common or rare disease?

Well, you know, you're right, you're right, because there are more drugs out there that treat common diseases than they do for rare diseases.

It's a question of incentives

It's going to cost the same to develop a new drug, whether it saves a thousand people, a hundred thousand, or a million.

But when it comes to a cure for a million people, the benefits are even greater.

So the incentive is greater and new drugs are developed.

In other words, bigger markets save lives.

In this case, you could say that hardship blesses corporations.

Now consider the following: If China and India were as rich as the United States is today, the market for cancer drugs would be eight times what it is today.

We haven't gotten there yet, but it's happening

As other countries get richer, the demand for pharmaceuticals will increase dramatically.

That means increased incentives for research and development, benefiting people all over the world.

A huge market creates incentives for ideas, whether it's software, computer chips, or design.

If you're from Hollywood in your audience, you'll understand why the budgets for action movies are higher than for comedies, because action movies are more acceptable to different cultures and languages, so the market for these movies is bigger.

More investments are made, budgets are bigger

If a larger market increases incentives to generate new ideas, how do we maximize incentives?

By having a single world market and globalizing the world

Let me put it this way: Ideas are meant to be shared, so one idea can help the world, the whole market.

One idea, one world, one market

How to generate new ideas?

one way is

globalization and trade

How else do you generate new ideas?

to increase the number of creators of ideas

Idea creators come from many places

Artists, innovators, people on the TED stage.

I'd like to focus on scientists and engineers, because there's relevant data, and I care about data.

Well, today 0.1 percent of the world's population are scientists and engineers.

(Laughter) America was the idea leader.

Many of these scientists and engineers are in the United States.

But the US is about to fall from being the idea leader.

i am very grateful for that

it's a good thing

It's fortunate that the color of idea leaders fades away, because for too long the United States and a handful of other developed nations have shouldered the entire burden of research and development.

But consider this: If the world as a whole were as rich as the United States is today, there would be more than five times as many scientists and engineers, producing ideas that would be shared and beneficial to everyone.

Reminds me of the great Indian mathematician Ramanujan

How many talented people like Ramanujan are in today's India, shouldering the toil of the fields and barely making ends meet? they have the ability to enrich the whole world

i haven't gotten there yet

but it will happen in this century

The real tragedy of the 20th century is this: If you think that the people of the world are gigantic computers with massively parallel processing, the biggest tragedy is that billions of processors weren't connected.

But in this century China is connected

India will be connected

Africa will be connected

There will be people like Einstein in Africa this century.

A little data, this is China.

In 1996, there were less than 1 million college freshmen in China, and in 2006, there were more than 5 million.

think about what

We all benefit from other countries getting richer.

Don't be afraid to make other countries rich

That's what we have to accept -- rich China, rich India, rich Africa.

We need a bigger demand for ideas, the big market I was talking about earlier, and we need a bigger supply of ideas to the world.

Now you know why I'm optimistic

Globalization increases the demand for ideas and increases the incentive to generate new ideas.

Investing in education increases the supply of ideas

If you look at the history of the world, you can see some reasons for optimism.

From the beginning of mankind to 1500, economic growth is zero, nothing.

A little economic growth between 1500 and 1800, but less than a century in a century.

1% in the 1900s

In the 20th century, the figure slightly exceeded 2%.

expected to rise to 3.3% or more in the 21st century

At this rate, by 2100, the world's per capita GDP will be $200,000.

This isn't US GDP per capita -- that's over a million -- global per capita GDP, which is $200,000.

It's not too far

we will not achieve

our grandchildren will achieve

In addition, this estimate is rather conservative.

Kurzweilian, this is a pessimistic one.

I'm like Eeyore the brooding donkey from "Winnie the Pooh"

(Laughter) What is the problem?

What about the Great Depression?

Let's examine it, let's look at the Great Depression.

GDP per capita from 1900 to 1929

Imagine you're an economist in 1929, predicting the growth of the U.S. economy without knowing that the economy is about to tumble, without knowing that you're about to face arguably the greatest economic disaster of the 20th century.

What would you have expected without knowing this?

Based on your predictions and predictions from 1900 to 1929, it would look something like this.

If you're a little more optimistic, you can build on the Roaring Twenties and come up with something like this.

So what actually happened?

I fell off a cliff, but I recovered

In fact, the second half of the 20th century was more than anyone expected based on the first half of the 20th century.

Growth can wash away even the Great Depression.

Well what else?

oil oil big subject

Oil was $140 a barrel when I was keeping records

So there was one question that everyone was asking: "Is China going to finish our milkshakes?"

(Laughter) And there's some truth to that, because the resources we have are finite, and as growth accelerates, so does our demand.

But I think it goes without saying for everyone here that rising oil prices are not always a bad thing.

And, as we all know, it's the energy that matters, not the oil.

Higher oil prices create greater incentives for energy research and development.

We can see that in the data

Higher oil prices lead to more energy patents

The world has more power than ever to overcome rising oil prices, and I've already told you why.

One idea, one world, one market

I'm optimistic as long as I have two ideas: continue to globalize the world market, continue to expand our cross-border cooperation, and continue to invest in education.

Now, the United States has a particularly important role to play in this context by continuing to globalize our education system and make our education system open to students from all over the world, because our education system is a candle, and other students come and light their own candles.

Remember what Jefferson said

They say, "If someone comes and lights a candle out of our flame, he will have light and we will not be in darkness."

But Jefferson was a little wrong,

The truth is, when they light candles from our flames, the light that shines on everyone doubles in intensity.

my outlook is optimistic

Spread your ideas, spread your light

thank you

(applause)

This "machine" that we all have in our skulls reminds us of a proverb in Woody Allen's comment about what is the best thing to keep in your head.

and this is the machine

Made for change, that's all

It gives us the ability to do tomorrow what we couldn't do today, today what we couldn't do yesterday.

Naturally born incompetent