In particular, I think where my time slips through is things like technology, checking things.

Let me give you an example

When you get this email -- you've probably had emails like this before.

I was tagged in a photo

As soon as I get this email, I can't help but check the photos.

'Cause if it's a weird picture, you're in trouble, right?

i have to check it soon

But just clicking "view photos" takes about 20 minutes.

(Laughter) And to make matters worse, you know it's going to take you 20 minutes, and you know it's going to happen again.

I'm in this situation, I check my email, I pull down and update, but in fact, 60 seconds later, I pull down again and update.

why are you doing this?

it doesn't mean anything

But let me give you a hint why this happens.

What do you think makes more money in the United States than movies, game parks, and baseball combined?

it's a slot machine

Why are slot machines so profitable? to play with such a small amount

I use coins

why so much?

well so to speak

my phone is like a slot machine

Every time I check my phone I see at the slot machine What do I get?

what will come out?

Every time I check my email, I spin the slots and chant, "What's coming up?"

Every time I scroll through the news feed, I spin the slots to see what comes up.

I mean, as a designer, I know how this works, I know exactly how this psychology works, I know exactly what's going on, and yet I just can't stop and I'm addicted.

what are we doing

Because the relationship with technology is either all or nothing.

You can't help but worry that if you turn it on and you're connected to the internet, you're distracted all the time, or if you turn it off, you'll miss out on important information.

In other words, do you get distracted or worry that you might miss information?

right?

we have to take back our choices

I want to build relationships with technology, and I want technology to take back control over how I spend my time, and that's why I need the help of designers, because knowing just isn't going to do you any good.

I need help with the design

What will it look like?

Let me give you an example of a situation we all face: chat text messages.

There are two characters

Nancy is on the left working on a document, John is on the right.

John suddenly remembers, "I have to ask Nancy to send that document before I forget."

John sends a message that distracts Nancy.

Disturbing each other's attention with shoes is a daily occurrence, right and left.

This is very costly, because it takes an average of 23 minutes to restore attention each time we interrupt each other.

You do two completely different tasks before you get back to where you started.

This is what Professor Gloria Mark showed in a joint study with Microsoft Research.

And it turns out that this breeds bad habits.

We are conditioned and trained to defocus ourselves the more interruptions we receive from the outside.

In fact, we automatically pause every three and a half minutes.

this is serious

How to fix bad habits?

Nancy and John have an on or off relationship.

Nancy wants to disconnect, but she can't because she's afraid. What if I miss important information?

Design can fix this problem

So again, Nancy is on the left and John is on the right.

"I have to send that document," recalls John.

But this time, Nancy can display "Focused."

Nancy drags the slider until it says "30 minutes focus" and smacks into focus mode.

Now, if John wants to send a message, he can process it quickly and forget it.

But this time the message is on hold and Nancy is uninterrupted [delivered when Nancy is free] You can forget about John too.

But there's one final condition for this mechanism to work: if it's a really important requirement, then Nancy should know that John can interrupt it. [Interruption]

But this way, accidental and inadvertent interruptions are not permanent, only conscious interruptions. We do two things.

First, we're creating new options for Nancy and John, and there's a second little thing going on.

The question you want to answer has changed.

The purpose of chat was, "Let's design it so that it's easy to send messages." "Make it easy to send messages." Let's turn this goal into something more meaningful and human.

So upgrade your goals

By the way, do designers really care about this?

Do you want to discuss meaningful, human goals?

I'll tell you one story here.

A little over a year ago, I was invited to host a meeting between a top engineering designer and a Vietnamese monk, Thich Nhat Hanh.

Thich Nhat Hanh is an international evangelist of Zen mindfulness meditation.

this was the best meeting

Picture a room -- on one side of the room is a tech group, and on the other side of the room is a group of shaved Buddhist monks in long brown robes.

Now the question and answer is: profound human values, what is the future of technology? What kind of future would you design for profound questions and meaningful human values?

And central to our conversation is listening carefully to what these values ​​mean.

He joked, instead of a spell checker, how about a compassion checker? I mean, the one word you emphasized just so happened — someone else might find it offensive.

So do these kinds of conversations happen in the real world, not in the design meetings I just mentioned?

The answer is yes, one of my favorites is couchsurfing.

Couchsurfing is a website that matches people looking for free sofas to sleep in overnight with people who want to provide them.

Great service, but — what are Couchsurfing's design goals?

What are the design goals of Couchsurfing?

You think it's a match between the guest and the landlord, right?

right?

That's a pretty good goal.

But that would just deliver the message, just like the previous message example.

So what's more meaningful and human?

The goal Couchsurfing sets is to make the experience and relationship between strangers lasting and positive.

The best thing about this goal is that in 2007, Couchsurfing introduced a way to measure it, and that's the beauty of it.

I will introduce how it works

Every design goal needs a way to measure it.To know how successful a goal is, you need a way to measure its success.

The method of couchsurfing is to take two people who meet, take the number of days they spent together, and estimate the amount of time they spend together.

After they've spent a few days together, I'll give them a survey. How meaningful was the experience?

Was the time spent with the person you met a good experience?

From the number of good hours, I subtract the number of hours spent on couchsurfing sites, because time online is an expense.

cannot be rated as successful

What this calculation shows is the good time created here -- the net time of "GoodTimes."

It's the net worth of hours that wouldn't have been possible without couchsurfing.

Can you imagine how motivating this is? Because every day you go to work, you'll get a new metric of success, a measure of your contribution to the meaningful time spent by your users, a metric that wouldn't even exist without your daily work.

Can you imagine the whole world spinning like this?

Can you imagine? If the social network is interested in, say, cooking, it uses as a measure of success the number of hours of cooking nights it hosts and the number of hours spent reading and enjoying cooking articles, minus the number of hours spent reading uninteresting articles and the number of hours spent scrolling through the screen.

Imagine a professional social network, where the metric of success is not the number of connections made or the number of messages exchanged, but instead the metric of success is the number of job offers participants are willing to accept.

Subtract the time the participant spent on the web from that value

Or imagine a dating site, an app like Tinder, where counting the number of times a participant swipes left or right is the current measure of success, but instead we look at the number of intimate, romantic, fulfilling relationships.

Of course it's based on the subjectivity of the user.

Can you imagine the whole world spinning in a way that helps people spend their time meaningfully?

To do that, we need a new system, because, as you probably think, today's Internet economy -- today's economy in general -- is measured in time spent.

The more users, the more usage, the more time they spend -- that's how success is measured.

but this problem is already solved

When we solved this problem organically, we said we needed a different way to measure product value.

I preached that organic was a different food.

Organic is a different category of food, so you can't compare prices.

We solved this problem with Leed certification, and I explained that it's a building like no other, built on a new set of values: environmental sustainability.

What if we brought the same thing into technology?

What if the overall purpose and goal was to help create new and meaningful contributions to human life that have a net value?

And what if we could quantify that value in a way that has never existed before and actually use it?

How about putting this in the premier product space of the app store?

Imagine web browsers supporting links to this kind of design product.

Can you imagine how exciting it would be to create and live in such a world?

Such a world is possible even today.

Business leaders need only use it as a primary measure of their net contribution to human life.

Please feel free to discuss it

You may not be very good at it at first, but let's start talking.

Designers, redefine success, redefine design.

Designers have more power than the rest of the organization in shaping our life choices.

It's probably akin to the Hippocratic Oath in medicine, recognizing the responsibility and high aspirations of treating patients.

I wish designers had the same vows when it comes to new designs of this kind.

And we, the users, should state that we need this kind of technology today.

As difficult as it may seem, McDonald's put salads on the menu only after consumer demand.

Walmart only put organic food on the table after consumer demand.

We have to make it clear that we want this new technology.

we can express

And by making a statement, we shift from a world that is oriented and operated solely on the basis of time spent, to a world that is oriented by the number of hours well spent.

I want to live in a world like this I want to have dialogue like this

Now is the time to start talking

thank you

(applause)

we all have our own preconceptions

For example, we tend to think that it's very difficult to reform a failing government.

We tend to think that government systems are old-fashioned, cookie-cutter, and that their leaders are probably very bureaucratic and change-averse.

Well, today I'm going to challenge that speculation.

I want to talk about a system of government that not only has reforms on the right track, but in less than three years, has produced spectacular results.

This is what a public school classroom in India looks like.

there are a million schools like this

Even I, who has lived in India for a long time, finds it quite heartbreaking to step into a school like this.

50% of students fall behind in their studies by the age of 11, and have no chance of picking up from there.

Such an 11-year-old can't do simple addition, and can't form a grammatically correct sentence.

It's something even an eight-year-old can do.

They tend to drop out of school by the age of 13 or 14.

In public schools in India, not only education, but also textbooks, workbooks, school meals, and sometimes scholarships are provided in cash.

But today, 40 percent of parents would rather drag their children out of public schools and pay for them to put them in private schools.

By comparison, in a much richer country, the United States, that number is only 10 percent.

It shows how the public school system in India is collapsing.

In the summer of 2013, I received a phone call from a very talented woman named Sreena Rajan.

At the time, she was Director of School Education in the state of Haryana, India.

She said, "I've been the director here for two years.

I've tried many things but none of them work

Can you help me? ”

Let me tell you a little bit about Haryana.

Haryana is a state with 30 million people

There are 15,000 public schools there, with more than 2 million children attending.

Basically, on that phone call, I made a promise to help public education in states and institutions the size of Peru and Canada.

When I started this project, I noticed two things that were really annoying.

First, I've never done anything like this before.

Second, many people have done it, but probably not very successfully.

My colleagues and I have looked all over India and around the world, but we haven't found a case where we can just bring it to Haryana and reproduce it right away.

I knew I had to come up with my own way of doing things.

Anyway, we just jumped straight in, and then all sorts of thoughts started flying around.

People said, "Let's change the way teachers are recruited. Let's hire a new principal, train them, send them on study trips abroad. Let's bring technology into the classroom."

By the end of the first week, we had 50 ideas, all of which sounded great and seemed right.

There's no way you can do 50 things.

So I said, "Wait a minute

First, at least decide what you want to achieve.”

So after much discussion, Haryana set a goal: By 2020, 80 percent of students will have grade-appropriate knowledge.

Now it's not the details of the goal that matter, but how specific the goal is.

Because of that, we can take all these ideas thrown at us and know which ones to implement.

Can this idea achieve this goal? If so let's continue

But if you can't achieve it or you're not sure, stop.

It may sound simplistic, but having a specific goal has helped us sharpen and focus our minds in the process of change.

Looking back over the last two and a half years, we've made tremendous progress.

Now that we had our goals, we needed to know what was wrong and what was broken.

Before I went to school, many people told me, "The quality of education is poor because teachers are lazy and don't come to school," or "It's because they're incompetent and don't know how to teach."

When I stepped inside the school, I knew it was completely unfounded.

Most teachers actually went to school

After talking to them, I found that they could do elementary school classes perfectly.

But they didn't "tell me"

I went to one school and was made to supervise the repair of classrooms and bathrooms.

At another school, two teachers went to a bank branch near the school to transfer scholarships to the accounts of the children.

At lunchtime, most of the teachers took their own time to supervise the preparation and management and serving of school lunches.

So I asked the teachers, "What's going on? Why aren't you teaching?"

They said, "This is what we do.

When the superintendent comes to see it, he confirms these things-

Is the toilet completed? Is school lunch served?

When the headmaster goes to a meeting of the Education Bureau, it comes up on the agenda."

Over the past 20 years, India has struggled with issues like access to school, access to school buildings, access to enrollment, and how to get children to school.

So to address these challenges, governments have launched a number of initiatives, and implicitly, teachers have been the ones to implement them.

It's not dictated, it's implicit.

So what was really needed was not to give them more training or to monitor their attendance, but to tell them, "What's important for you is to go to class and teach."

It's the quality of instruction that should be monitored, evaluated, and celebrated, not the rest of it.

As I combed through the education system and dug deeper, I discovered the core root causes that determined and shaped the behavior of people in this system.

I realized that I couldn't do many other things without changing those specific things.

Even if we can train them and bring technology into the schools, the system won't change.

Addressing these vague underlying issues was key to this initiative.

Now that I knew my goals and challenges, I had to come up with a solution.

I didn't want to start from scratch, so I said, "Let's see what's around us."

We've found these small, but impressive, pilot practices at home and abroad.

It's a small-scale effort by NGOs and foundations.

Interestingly, none of them actually scaled up.

Every initiative was limited to 50 schools, 100 schools, 500 schools.

But what we were looking for was a solution for 15,000 schools.

So we looked at why, if the initiative is successful, why not scale it up?

Here's what happened: Normally when NGOs get involved, they don't just bring in their expertise, they also bring in additional resources.

It may be money, it may be people, it may be technology

And in the 50 or 100 schools that the NGOs are involved with, this additional resource speaks for itself.

But imagine, the representative of this NGO goes to the Director of School Education and says, "Let's do this in 15,000 schools."

Where are we going to find the money to scale this up to 15,000 schools?

no one has extra money, no resources

That's why we can't scale up the reforms.

Right at the very beginning of the plan, we said, "Whatever we do, it has to be scalable, it has to work for all 15,000 schools."

So we have to work within the budgets and resources that the state has right now.

Easier said than done

(Laughter) At this point, I'm pretty sure everyone on the team hated me.

I spent a lot of time in offices, in cafes, sometimes in bars, scratching my head and saying, "Where's the solution and how are you going to solve the problem?"

In the end, we found solutions to many problems.

Let me give you an example

When we talk about effective learning, we often talk about experiential learning.

Students shouldn't memorize material from textbooks, they should do "activities," which is a more effective way of learning.

Basically, students are given objects such as beads, building blocks, and abacuses.

But we don't have the money to give those materials to 2 million students in 15,000 schools.

I need another solution

nothing came to mind

One day, one of the team members went to school and saw a teacher picking up stones and tree branches from the schoolyard, bringing them into the classroom, and giving them to the students.

That was a big hint for us.

In the textbooks used in Haryana today, after every lesson there is a little column with instructions for teachers: "Here's an activity for teaching this concept.

In addition, in order to practice this activity, we will introduce things that can be used as auxiliary teaching tools around us, such as schoolyards and classrooms.”

Throughout Haryana, we see teachers creatively using a variety of objects to guide their students.

So everything we've planned is actually working from day one in all 15,000 schools.

this leads to the last story

How do we get 100,000 teachers in 15,000 schools to do it?

Once upon a time, the Schools Department had a very interesting process.

I call it "Chain of Expectations"

First, we send a letter from the headquarters and send it to the prefectural office, which is the department below.

What headquarters expects is that at every county office, an employee will receive the letter, open it, read it, and forward it further down to the district office.

The next expectation is that someone else at the district office will receive the letter, open it, read it, forward it, and eventually reach the 15,000 principals.

And the next thing we expect is for the principal to receive the letter, understand what it says, and act on it.

this is a bit silly

I know it's better to use technology, but I also know that most of those schools don't have computers or email.

Teachers, however, have smartphones.

They use SMS and Facebook WhatsApp all the time

So now in Haryana, we have hundreds of WhatsApp groups connecting all the principals and teachers, and when we need to get in touch, we post to all the WhatsApp groups.

it spreads like wildfire

We can quickly find out who received the information and who read it.

Teachers can immediately ask for clarification

And what's even more interesting is that HQ isn't the only one answering that question.

A different teacher in a completely different part of the state would stand up and answer a question.

Everyone is acting like a friend, and things are happening.

If you go to a school in Haryana now, things have changed.

The teacher is back in the classroom and teaching

While sometimes making full use of innovative technology—

When supervisors visited schools, they began to check not only on the construction of toilets, but also on the quality of teaching.

Every three months, all students in the state are assessed on their learning outcomes, and schools that perform well are rewarded.

Schools with low ratings go through tough debates to find out why.

Of course, additional support will be given to improve further in the future.

In the field of education, it's very difficult to get immediate results.

Generally, when we talk about global, large-scale change, we talk about seven to 10-year periods.

in Haryana

Over the past year, three separate surveys measuring student learning outcomes have been conducted that show that something important and unique is happening in Haryana.

The decline in student learning levels has stopped and started to rise.

Haryana is one of the few states in India that is improving, and the speed of improvement is definitely the fastest.

It's still early days and there's a long way to go, but this gives me great hope for the future.

I recently went to a school, and as I was leaving, I met a woman whose name was Parvati, the mother of a child, and she was smiling.

When I asked, "Why are you smiling? What's wrong?"

She said, "I don't know what happened, but my kids are studying. They're having fun. I'm going to stop looking for private schools for the time being."

Let's get back to the beginning. Can we reform the government system?

i think i can definitely do it

If you give them the right leverage, they can move mountains.

thank you

(applause)

I had an intense experience when I was a kid, and from that day on, I've been searching for the same experience, but I've been searching in the wrong places.

That certain experience is not virtual reality (VR)

it was music

Today's story begins there

This kid is me, and I listen to "The Beatles."

If you look at this expression, you'll know what kind of experience I've been searching for.

Music goes straight into the pulse of emotion, gets into your veins and beats your heart.

deepen every experience

music

(music) Two exquisite guys, Mackenzie Stabert and Joshua Roman.

What is music? (Applause) Yeah.

Music adds a touch of emotion to everything

Will this talk also have an effect?

A certain piece of music intersects with a certain moment to create a cellular impact.

When I hear a certain song, the memories of a certain woman I spent that summer with me instantly come back to me.

It's been a while, Stacey.

After that experience, I started to want more

I wondered if I could create more intense emotions by adding more effects other than music.

That was the beginning of my music video production career.

It was like this in the beginning

this is my brother jeff

I'm sorry, Jeff.

(Laughter) This picture of me is equally hilarious.

It's a great move

i wish i was a dancer

(Laughter) There were more experiments like this, and then this changed.

All of them are the result of searching for the same experience, to contain that impact in the work.

Still not satisfied

Adding visuals to music certainly tells a story, but we couldn't replicate the emotion that live music brings.

For someone who has dedicated his life and professional career to making music videos, this is an unsatisfying conclusion.

Did I take a wrong turn? I kept asking myself

I began to wonder if I could make the experience more intense by engaging more people here, people in the audience.

So Aaron Cobrin and I started experimenting with new technologies that could bring you more into the world of cinema, like "The Wilderness Downtown," where you can see your childhood home, "The Johnny Cash Project," where you can draw a self-portrait, and "3 Dreams of Black," where you can experience interactive dreams.

I tried to get closer to the human heart and imagination beyond the image projected on the screen.

still something was missing

I couldn't reproduce the pure emotion that pure music creates.

So I started looking for new technologies that I had only read about in science fiction novels.

And after a few years, I stumbled upon a prototype of a certain technology.

It's the work of Nonnie Della Peña in the Mark Bolas lab at the University of Southern California.

This is what I experienced and intuitioned! and

It was a shock that tasted like thunder

it was virtual reality

This is the prototype when we first met five years ago.

and now

I immediately started working with this new medium, and in the process, I realized that VR would play a very important role in the history of the medium.

I was convinced that VR was the final form of the medium.

I can seriously say that because in VR, it is possible to go beyond the process of experiencing the creator's visual experience, from the process in which the audience feels it by looking at the work, to the process in which they directly experience it.

Don't worry, I'll explain.

(Laughter) Back to the origins of the medium, and my guess is that it goes back to storytelling around a bonfire.

Our ancestors tell stories of how one day they went hunting for woolly mammoths in the tundra.

listen to his words and translate them into your own experience

I do the same interpretation of cave paintings, mammoth hunting storybooks, plays, radio broadcasts, TV shows and movies.

These mediums require a process called "suspension of disbelief," because there is a gap between the reality of the story and the self-consciousness with which we perceive it as our experience.

I use the term "self-conscious" here because it describes the consciousness that arises as we experience and actually perceive our surroundings.

VR bridges the gap

That way you can hunt with your clan chief in the tundra.

Or you become a chief yourself

Maybe a woolly mammoth

(Laughs) Why is VR groundbreaking?

In other mediums, your consciousness interprets the medium.

But in VR, your consciousness itself is the medium.

VR has endless possibilities

How advanced are you now?

What is the state of the art for this medium?

we are here now

It's about the same time as the first year of film technology.

This is a film by the Lumière Brothers, and it is said that people who saw this film for the first time panicked and ran away because they thought they were being run over by the train in the video.

Much like what happened in the early days of the medium, VR should evolve from being just entertainment to being a storytelling medium.

It took me a long time to realize that the medium of film is the most effective language for telling stories.

Now in VR, it's more like you're still learning grammar instead of writing a language.

At our VR company, Vrse, we made 15 films last year, and we learned a lot along the way.

For example, being able to directly enter into the audience's senses, and into your emotions and experiences.

Experience it for yourself here

In this demonstration, we'll stretch as much of the view as possible into this giant rectangle.

then let's leave

First of all, in VR, the movement of the camera needs to be devised.

Getting this wrong can make you sick

I found that moving the camera in a straight line at a constant speed would get rid of that phenomenon.

On the first day of film school, they teach you that you must master all the methods before you can do anything against the methods.

We use VR techniques

I'm still in the early stages of learning, but I'm experimenting with contradicting methods to create creative effects.

Here, I tried increasing the speed at the stage of taking off from the ground.

By doing so, I want you to experience the feeling of actually leaving the ground.

VR makes it possible

(Music) Of course, music also plays a big role in this medium.

music guides our emotions

In a shoot I co-produced with The New York Times, Zach Richter, and my friend JR, I flew in a helicopter, and although I was 2,000 feet above Manhattan, I didn't feel any fear.

I want to praise JR's guts.

music will guide you there

(Music) Contrary to popular belief, VR actually builds from composition, which is very different from movies, which are constructed from rectangular frames.

The essence of VR is where consciousness resides, and where the world moves around you.

This short film, "Waves of Grace," co-produced by Vrse, United Nations Gabo Arora and Imran Ishmal, also changes the role of close-ups in VR.

A close-up in VR allows you to get really close to the person.

People enter into your personal space, a space that is usually reserved only for those you are intimate with.

And then you feel a sense of familiarity with the character, a feeling that comes from getting closer to the other person.

Directing VR is different from thinking about a rectangular composition in a movie.

It's more of a choreography to get the viewer's attention.

The technique we use to direct attention is called "spatialized sound."

By changing the position of the sound, for example forward, left, right, back, etc., when you turn around, the sound rotates at the same time.

You can use that technique to guide your audience's attention.

So if you hear someone singing behind you, it might be Bono.

(Laughter) VR makes you feel like you're part of something.

Humans have spent most of their history as members of small families.

It started in a cave, and since then it's become a member of a clan, a villager, a townsman, and now a global citizen.

But it's human instinct to feel a strong connection to our local surroundings.

VR enables local experiences anywhere, with anyone

It's a device that makes you feel empathy.

In the movie "Clouds Over Sidra," when we go to a Syrian refugee camp, it's not just about seeing a story about a faraway place, but about being here.

What will happen next?

The difficulty is that in past media, the format was fixed at birth.

Cinema is in the form of rectangular images, from the early filmmaker Muybridge's horse to the present day.

This format has not changed

But VR as a form and as a medium is not yet complete.

It's not like we're using cels or paper or TV signals.

use what humans use to make sense of the world

We're using your senses, it's kind of like painting, but we've only used two so far.

Maybe one day we'll be able to use all of our human senses to choose how we experience stories.

Now we call it virtual reality, but one day this will go beyond virtual reality.

what should it be called?

For example, what if instead of telling you about a dream you had one day, you could actually enter the dream?

What if we could not only experience the reality of what happens on Earth, or surf gravitational waves on the edge of a black hole, or even give birth to a new nebula, but also be able to communicate what's going on in our heads without words?

These have gone beyond VR (virtual reality)

I honestly don't know what to call it

But I think you know the direction.

So far, I've only been intellectually expressing what I call experiential media.

Let's experience

Google Cardboard in your hand

open the flap

Tap the power button to unlock your phone

If you're watching from home, I'll show you the cards now, so download the app on your phone and you'll get Google Cardboard along with it.

You may have played with a cardboard box when you were a child, but even now, as an adult, I hope you will look inside the box and experience the shock of lightning that you felt at that time.

You're about to take part in the biggest joint VR experience ever.

Like the good old days, let's all watch the same video at the same time.

hope it goes well

what is the countdown going on

Audience: ...15, 14, 13, 12, 11, 10, 9 8, 7, 6, 5, 4, 3, 2, 1 (birds singing) (whistle) Audience: (roaring) (video) JR: I'll tell you how to shoot "Walking New York" for the cover of The New York Times Magazine.

It's not going to work unless you're stuck in a helicopter and you're completely perpendicular to the subject.

Once I had it perfectly overhead, I had to redo it several times because of the wind, and then continue shooting from there.

(Video) Female voice: God protect us from evil [from "Waves of Grace"] God of truth, light

You gave us life, you took it away

if that is your will

Give peace to the hearts of those who have lost loved ones

Please give me the power to live again

(Music) [From "Clouds Over Sidra"] (Video) (Children's Voices) Children's Voices: There are more children than adults in Zaatari now.

Sometimes I think we're the ones in command

Milk: how was it?

(Applause) It sounds like you deliberately gave a standing ovation.

I knew there would be applause at the end

(Applause) I want everyone to experience what you just experienced.

And by doing so, we can all come together and start cultivating this technology not as a technology, but as a humanistic method.

To that end, last November, we created a VR project called "The Displaced," which was a joint venture between The New York Times and Vrse.

On the first day of the project, we distributed 1 million Google Cardboards to The New York Times Sunday subscribers.

A strange thing happened that Sunday morning.

It ended up in the hands of a lot of people, even people who weren't the recipients of the subscriptions.

At the same time, Instagram was flooded with posts like this:

Have you seen it?

Music has steered me in a certain direction.

And because of that, millions of children have just had the kind of character-building experience that I had as a child.

What they experienced will surely surpass the excitement I felt.

Let's see where that experience will lead them.

thank you

(applause)

My little Hawaiian aunt and mother often told me stories of Kalaupapa, a leprosy colony in Hawaii surrounded by the world's tallest wave cliffs, and Father Damien, a Belgian missionary who devoted his life to the Hawaiian community.

As a young nurse, my aunt was teaching nuns how to care for leprosy patients nearly a hundred years after Father Damien's death from leprosy.

My aunt told me the story of riding a mule up the edge of a serpentine cliff to Kalaupapa while my uncle played her favorite hula song on the ukulele.

As a child, there was always something that made me wonder

First, why did the Belgian missionary choose a place so completely isolated, like Kalaupapa, when he knew that if he cared for a leprosy patient, he would inevitably become infected.

Second, where does Leprosy, the pathogen of leprosy, come from?

Why are indigenous Kanaka and Maori people susceptible to leprosy, maipake?

The question was what was unique about the Native Hawaiians, and I wanted to know the differences in their genetic makeup.

On the other hand, when I entered high school and the Human Genome Project began, I realized that I wasn't the only one trying to make connections between our unique genetic lineage and health and disease.

As you know, the $2.7 billion Human Genome Project promised us an era of predictive and preventive medicine based on our unique genetic makeup.

It's self-evident, but in order to achieve this dream, we'll need to sequence the human genomes of diverse populations to capture all the genetic diversity of humans on the planet.

And yet, ten years later, it's still incredible to see that 96 percent of genomic studies on genetic variants common to certain diseases only look at people of European ancestry.

So, as everyone knows, people with other ancestry make up only 4% of all studies.

In my research, I found that less than 1 percent of the indigenous peoples in the study were.

That begs the question: Who is the Human Genome Project for?

Just as each person has different hair and eye color, the way drugs are metabolized also differs depending on the genome.

You'll be surprised to hear this, because 95 percent of clinical trials are also exclusively in people of European ancestry.

This bias and systematic lack of indigenous involvement in clinical trials and genomic research is partly due to past distrust.

Here's an example: In 1989, researchers at Arizona State University took blood samples from the Havasupai tribe of Arizona, promising to alleviate the suffering of the type 2 diabetes that plagued the Havasupais.

When the Havasupai found out, they filed a lawsuit and won $700,000 to bar Arizona State University from conducting research in the Havasupai Neighborhood.

The result was a chain reaction that put several tribes in the American Southwest on hold, including one of America's largest Native American tribes, the Navajo Nation.

Despite this history of mistrust, I still believe that indigenous peoples will benefit from genetic research.

And if we don't do something now, the health gap will only continue to grow.

Hawaii, for example, has the longest life expectancy compared to any other state in the United States, but Native Hawaiians like me live 10 years less than non-Indigenous Hawaiians. They have the highest rates of obesity and type 2 diabetes, and they also have the highest rates of cardiovascular disease and cancer, the two leading causes of death in the United States.

So how can we make sure that the people most in need of genome sequencing aren't left behind?

My goal is to make genetic research more localized and put genome sequencing technology in the hands of indigenous peoples.

Genomes are usually sequenced in the lab.

This is the image of the sequencer so far

is huge

It's the size of a refrigerator

There are obviously physical limitations to this.

What if we could do genome sequencing in the field?

What if sequencers were pocket-sized?

This nanopore sequencer is 1/10,000th the size of previous sequencers.

Now you don't have the physical limitations of the past, you don't have to be tethered to a lab bench with electrical cords, you don't need a lot of chemicals, you don't need a computer monitor.

Genome sequencing technology becomes open, accessible, integrated and collaborative with indigenous communities.

Empower yourself as a citizen scientist.

Now, 100 years after my aunt's time, Kalaupapa has the technology to sequence the genome of leprosy pathogens in real time using portable genome sequencers, remote access to the Internet and cloud computing.

But only if the people of Hawaii want it.

where we live, on the terms we want

"Indigenomics" means science by people, for people.

We start by getting information from tribal consultations, and we focus on educating indigenous peoples about the pros and cons of using genomic information.

One day, we hope to have our own indigenomics lab, where we can conduct our own research and train the next generation of indigenous scientists.

Finally, indigenous peoples should be partners in genomic research, not subjects.

And like the non-Indigenous Father Damien did, research organizations need to be fully immersed in Indigenous cultures, and this must be done.

mahalo (thank you)

(applause)

I'll never forget the laughter I had with my friends

I'll never forget my mother's voice just before I fell asleep

And I'll never forget the water flowing along the stream - the soothing sound

Imagine my pure terror.At 10 years old, I was told I was going to lose my hearing.

For the next five years, I continued to lose my hearing until I was diagnosed with hearing loss.

But I think being deaf is one of the greatest gifts I've been blessed with.

I can experience the world in my own way

We believe that these unique experiences of people with disabilities can help us create and design a better world for everyone, with or without a disability.

I used to be a lawyer specializing in disability rights, and I spent a lot of time trying to get the law upheld and trying to get mediation done.

Then I had to rush to study international law, because I was asked to do work to protect people with disabilities at a United Nations conference.

As a representative of a non-governmental organization, I devoted my energies to persuading people of the capabilities of people with disabilities.

But in doing so, and in doing so, and switching careers many times -- and my parents didn't really like it -- (Laughter), I came across a solution that could be a very powerful tool that could solve some of the world's biggest problems, disabled or not.

That tool is design thinking.

Design thinking is a process of innovation and problem solving

it has five stages

The first step is to define the problem and understand its constraints.

The second step is to observe and empathize with people in real life.

The third step is to come up with a lot of ideas. The more, the bolder, the better.

The fourth stage is prototyping, where we collect everything we can find, mimic the solution, test it, and improve it.

And finally, execution, to ensure that the solutions we come up with are sustainable.

Warren Berger said that design thinking allows us to look in many directions, to reconfigure, to refine, to experiment, and, perhaps most importantly, to ask outlandish questions.

Design thinkers believe that everyone is creative

I believe it's useful to bring people together from multiple disciplines, because multiple perspectives can be shared and combined, and ultimately integrated, to create something new.

Design thinking is such a useful and versatile tool that it has been applied in almost every industry.

I thought I could apply it to the problems I was facing, so I went back to college and got a master's degree in social design.

It's a discipline that explores how design can be used to bring about positive change in the world.

While in graduate school, I fell in love with woodworking.

But what I quickly realized was that there was a phenomenon that I could not perceive.

When you're using a tool, before the tool kicks back -- before the tool bounces back at you -- you hear the sound.

but i can't hear

So I decided, let's try to solve this problem.

My solution was safety glasses, which provide a visual warning of changes in the pitch of the tool's sound, even before the human ear can hear it.

Why didn't tool designers think of it earlier?

(Laughter) There are two reasons. First, I was a beginner.

I wasn't bound by expertise or conventional wisdom.

Second, because I was deaf.

My own experience has taught me the solution

As I continued, I found more and more solutions that were originally created for people with disabilities and ended up being chosen, accepted and loved by many people, with and without disabilities.

This is an OXO potato peeler.

It was originally designed for people with arthritis, but everyone loved it because it was so easy to use.

cell phone text message this is made for deaf people

you know i love you all

(Laughter) And I started thinking, what if we changed our mindset?

Why not start designing for people with disabilities first? not healthy people

As you can see, if you design for people with disabilities first, you'll often end up with better solutions than just designing for people without disabilities, not just for everyone.

I'm excited about this discovery, because the energy that goes into making it accessible to people with "disabilities" can be harnessed, transformed, and playfully experimented with as a force for creativity and innovation.

It allows us to move away from the mindset of feeling change, from the flawed notion of tolerance, to become the alchemist -- the magician the world so desperately needs to help solve some of its biggest problems.

I also believe that people with disabilities have great potential to become designers through the design thinking process.

Subconsciously, from a very early age, I adjusted my skills and practiced design thinking.

Design thinkers, by their very nature, are also problem solvers.

Imagine listening to a conversation and only understanding 50% of it.

I can't have you repeat every word

Opponent gets annoyed

So, unbeknownst to me, I took the indistinct sounds I heard as beats, translated them into rhythms, and combined them with the movement of my lips.

Years later, I was told that my writing had rhythm.

This is because I experience conversation as a rhythm.

Also, I've become very good at failing.

(Laughter) Literally.

I got a D in my first semester of learning Spanish.

But what I've found is that if you get motivated and fix a few things, you'll eventually succeed.

Design thinking also encourages people to fail often, because that's how they ultimately succeed.

Few innovations in this world have been successful from the beginning.

I experienced this learning in sports as well.

I will never forget my coach telling my mother, "If your daughter wasn't deaf, she would have made it to the U.S. national team."

What my coaches -- and even I didn't know at the time -- was that deafness allowed me to excel in sports.

When you lose your hearing, you're not just adapting your behavior, you're also adapting your physical sensations.

One example is that my horizons have expanded.

Consider a soccer player approaching the goal from the left.

I was the goalkeeper, the ball is coming from the left side.

This is the field of vision of a hearing person

i can see so much

So I could see the players here moving around and coming closer to the goal.

And because I know it so quickly, when the pass goes to that player, I'm ready and ready to shoot.

So, I've been practicing design thinking for most of my life.

It sharpens your powers of observation and allows you to notice things that other people don't.

The constant need to adapt has made me a great idea maker and problem solver.

I had to do this within constraints and limitations.

This is another issue that designers often have to deal with.

I recently went to Haiti for work

Practitioners of design thinking often go to extreme environments because they often lead to good designs.

And Haiti - it was the worst place.

I lived and worked with 300 deaf people who were forced to relocate after the 2010 earthquake.

Five and a half years later, we still had no electricity, no clean drinking water, no job opportunities, and crime was rampant and unpunished.

International aid agencies came one after another

But those institutions come with pre-determined solutions.

Those institutions didn't observe or try to adapt to the needs of the community.

One agency donated goats and chickens.

They overlooked that food was so scarce in the community that they took advantage of the inaudibility that while the deaf were asleep at night, people would break into their gardens and homes, steal their chickens and goats, and eventually all their livestock.

If this agency had taken the time to observe deaf people and communities, they would have found their problems, and they might have found solutions, such as using sunlight to illuminate locked huts at night to keep them safe.

You don't have to be a design thinker to implement ideas like the ones I talked about today.

you are creative

you're a designer everyone is

let someone like me help

Enlist the power of people with disabilities in the process of looking in many directions and solving big problems.

Thank you very much

(applause)

This is the Large Hadron Collider

27 kilometers in circumference

It's the biggest science experiment in history.

More than 10,000 physicists and engineers from 85 countries around the world have spent decades building this device.

In this device, we're going to accelerate protons, which is hydrogen nuclei, to 99.999999 percent the speed of light.

At this speed, it makes 11,000 loops per second of 27 kilometers.

Collide the protons with another beam of protons orbiting in the opposite direction.

bump into a giant detector

The detector is essentially a digital camera

This atlas detector is where I work

Below you can see the size of a standard EU human being drawn.

(Laughter) What size? It's 44 meters wide, 22 meters in diameter, and weighs 7,000 tons.

The conditions reproduced here are those that existed within a billionth of a second of the universe's birth, and we're recreating this inside the detector 600 million times per second, which is a very large number.

You can see this hunk of metal, and this giant magnet bends charged particles to measure their velocity.

This photo was taken a year ago

the magnet is in there

There's a real human in EU standard size, so you can see how big it is.

This summer, we're going to build a miniature Big-Bang in this area.

In fact, I got an email this morning saying that they finished assembling the last piece of the Atlas today.

So today, I'm going to announce that I've completed it, not for TED, but it's done today.

(Applause) It's really great.

Now, you may be wondering, "Why?"

Why do you want to create the conditions one billionth of a second after the universe was born?

Particle physicists have ambitions

The goal of particle physics is to understand what everything is made of and how it holds together.

"Everything" means me and you, the earth and the sun, the 100 billion stars in our galaxy, and the hundreds of billions of galaxies in the observable universe.

absolutely everything

Then he said, "To know what I'm made of,

You may say, "You can't just look at yourself."

In fact, we know that as we go back in time, the universe gets hotter and hotter and denser and denser and simpler and simpler.

It's not clear why that's the case, but it's happening anyway.

So I think that if we go back to the beginning of the universe, the universe will be simpler and easier to understand.

Everything that's complex and beautiful today -- including the human brain -- is a property of the universe that has grown cold and complex over time.

We think that if we go back to the beginning of the billionth of a second, it would be very simple, and that's what we've been observing.

tell a parable

There's a piece of snow on the palm of your hand, and when you look at it, it's an amazingly complex, beautiful thing. When you heat it up, it melts into droplets, and you know it was made of H20, or water.

In the same sense, we go back in time to understand what the universe is made of.

As we know today, the universe is made of

12 types of matter particles are bound by 4 types of forces

This pink thing is a quark that makes protons and neutrons, which are the atomic nuclei in our bodies.

Electrons, orbiting around the nucleus, follow orbits set by electromagnetic forces, and it's the photons that carry those forces.

What holds the quarks together is something else called a gluon.

And here we have the weak nuclear force, probably the most unfamiliar one.

But without this power the sun wouldn't shine

When the sun shines, it shoots out a tremendous amount of particles called neutrinos.

If you look at your thumb nail -- it's about one square centimeter -- there's about 60 billion neutrinos coming from the sun and passing through it every second -- and that's going through any part of your body.

And the reason you don't realize it is because weak force is exactly the right name.

Most of these particles were discovered in the last century.

The first particle, the electron, was discovered in 1897, and the last particle, called the tau neutrino, was discovered in 2000. I thought I'd say it was found on the outskirts of Chicago, because America is a big country.

at the tip of your eyes and nose

Just a stone's throw from the whole universe

(Laughter) This particle was discovered in the year 2000, so it's only recently that we've come to understand this.

What I find amazing is that we've discovered all the particles, no matter how small.

Starting with the observable universe, there are stages in size.

The size ratio from 100 billion galaxies 13.7 billion light years away to this Monterey is similar to the size ratio between this Monterey and these particles.

They're surprisingly small, and we've discovered a full set of these particles.

Ernest Rutherford, the most famous of my Manchester seniors, discovered the nucleus and said, "All science is either physics or stamp collecting."

I don't think he meant to insult anything other than physics, but he's from New Zealand, so it could be.

(Laughter) And what he's referring to is exactly what we're doing, which is stamp collecting.

Okay, I've collected particles. If you don't understand the reasons behind the patterns, if you don't understand why they work the way they do, you're really just collecting stamps. You're not doing science.

Fortunately, some of the greatest scientific achievements of the 20th century hold the key to understanding the story behind them.

Newton's laws of particle physics, so to speak.

It's a beautiful, simple formula called the Standard Model.

Printed on the front of a T-shirt, it will be a symbol of elegance.

This one

(Laughter) It was kind of mean to unfold the ceremony and show us the shocking footage.

But you can use this formula to calculate everything that happens in the universe except gravity.

From why the sky is blue, to why atomic nuclei don't fall apart -- in principle, if you have a big enough computer -- why DNA looks the way it does.

In principle, everything can be calculated from that equation.

but there is a problem

Anyone know what the problem is?

I will give champagne to the correct answer

Let's make it easier Let's make it easier by expanding the middle line

Basically, these terms describe any subatomic particle.

'W' indicates how to bond with force 'W'

Similarly, these are "Z"s for weak nuclear forces.

But this equation has an extra symbol "H"

yes it is H

H stands for Higgs boson

The Higgs boson has not yet been found

But it's a problem if you don't have it.

We need this extra term to make this elegant and precise calculation possible and to use these wonderful equations.

This is a prophecy, predicting new particles.

what does this particle do

I had plenty of time to think of good examples.

Back in the 1980s, we were asking the British government for funding for the LHC, and Margaret Thatcher at the time said, "If you explain what you're trying to do in a language that politicians can understand, we'll give you the money.

I want to know what that Higgs boson thing does."

So I told him this parable, and he seemed to understand.

The Higgs boson gives mass to elementary particles

The whole universe -- not just space, but me and you -- the whole universe is filled with something called the Higgs field.

Also known as the Higgs boson

For example, people in a room are Higgs particles.

As particles move through space, they interact with the Higgs boson.

Even if a less famous person moves around the room

People don't care, they can move through a room very quickly, practically at the speed of light, and that's what it means to have no mass.

Now let's say that someone very important, popular and smart walks into the room.

I can't get through the room easily surrounded by everyone

It's as if it gained mass and became heavier.

The Higgs mechanism works like that

Electrons and quarks, which are commonplace in our bodies and in the universe, are heavy, massive particles that are explained by being surrounded by the Higgs boson.

It's interacting with the Higgs field.

If this picture is correct, the Higgs boson should be found at the LHC.

If I'm not right -- it's a complex tangle of mechanisms, and it's still the simplest thing you can think of -- whatever the role of the Higgs boson as we know it has to be revealed at the LHC.

So that was the main reason we built this giant machine.

I'm glad you all knew about Margaret Thatcher.

(Laughter) So, I thought I'd let someone more well-known in America explain it.

this was one story

This is virtually guaranteed to be found at the LHC

And there's a lot more, and you've probably been asked about some of the big questions in particle physics.

For example, dark matter, dark energy, etc.

There are other forces of nature -- very beautiful ones -- that seem to change in intensity as you go back in time.

the strength of the force varies

The electromagnetic force, the force that holds us together, gets stronger as the temperature rises.

The strong force, the strong nuclear force, is holding the nuclei together, which makes them weaker. The standard model allows us to calculate changes in these forces, and all three forces, other than gravity, seem to become the same at one point.

It's as if there was only one beautiful, special power at the beginning of time.

but it won't

There's a theory called supersymmetry, which doubles the number of particles in the standard model.

In fact, according to this theory, it turns out that when the forces of nature go back to the time of the big bang, they all come together. It's a beautiful prophecy.

What's more, these supersymmetric particles are very strong candidates for dark matter.

Such compelling theories are now mainstream in physics.

If I were to bet money -- unscientific -- I would bet that these particles would pop up at the LHC.

Although there are many other things we hope to discover at the LHC,

In the last few minutes, I'm going to give you a different take on what I think particle physics is -- particle physics and cosmology.

The last few decades of modern science have produced a wonderful story of creation, about the universe.

In the spirit of Wade Davis's story, it could be treated in the same way as any wonderful creation story in the Andes or in the far north.

This creation story is equally interesting.

Here's the story: The universe, as you know, was born 13.7 billion years ago, and it was extremely hot, and the stuffy universe was smaller than an atom.

One billion times one billion times one million times one billion times one billion times after the big bang, one billion times after one billion times one million times one billion times after the big bang -- did I say that correctly -- the expansion began.

Gravity separated from other forces

And then the universe began to expand exponentially, and it's called inflation.

After a billionth of a second, the Higgs field appears and our materials, quarks, gluons, electrons, etc., gain mass.

The universe continues to expand and cool

A few minutes later, hydrogen and helium appeared in space, and that's all.

The universe was 75% hydrogen, 25% helium, and still is.

Then it continued to swell for about 300,000 years.

At that time, light began to come and go through the universe.

It's grown big enough that light can pass through it, and this is what we see as microwaves in the cosmic background radiation, which George Smoot describes as the ability to see the face of God.

After 400 million years, the first stars formed, and then other elements began to form from hydrogen and helium.

The elements that make up life, carbon, oxygen, iron, and all the other elements we need to make us, were made by these first-generation stars, and when they ran out of fuel, they exploded and threw these elements into space.

They gathered again to form the next generation of stars and planets.

On some planets, oxygen from first-generation stars combined with hydrogen to form water that covered the surface.

Primordial life evolved on at least one, and maybe only, of these planets, and over time life began to walk upright and leave footprints in the mud plains of Tanzania 3.5 million years ago, eventually leaving footprints on other worlds.

We've built this civilization, and we're going to light up the darkness, and we'll be able to see civilization from outer space, like this wonderful photograph.

One of my heroes, Carl Sagan, said, "These things -- not just this one, but everything you see -- the Saturn V rocket, Sputnik DNA, literature, science -- they're all hydrogen atoms taking 13.7 billion years to do.

I can only say that it is amazing

and yes the laws of physics

The correct laws of physics keep a beautiful balance.

If the weak nuclear forces were a little different, carbon and oxygen wouldn't be stable in the center of stars, and they might not exist in the universe.

I think this is a really great and important story.

Fifty years ago, I couldn't have told this story, because I didn't know that.

I believe that if civilization believes in the scientific story of the creation of the earth, the civilization that emerged as a result of the pure laws of physics and hydrogen atoms is truly irreplaceable to me.

That's why it's the LHC

The next chapter of this story will be written when the LHC goes live this summer.

I'm really excited and looking forward to seeing it go live.

thank you

(applause)

There are some really interesting people here...

psychologists are irresistible

(Laughter) For the past two days, I've used this opportunity to eavesdrop on some people's conversations and observe how they interact with each other.

From there, I can quickly say that at least 47 people in this room are currently exhibiting the psychological symptoms that I'm going to talk about today.

(Laughter) Some of you may want to know if it's about you.

(Laughter) But it's a bit rude to point your finger at me, and I'm not going to bother you.

My research field is called personality psychology, and it's part of a much broader field called the science of personality, which runs the gamut from studying neurons to narrative analysis.

Personality psychology uses a unique approach to trying to analyze how each of us, each of you, is similar to everyone else, similar to someone else, and different from everyone else in certain ways.

Now, at this point, are you already thinking, "I'm not interesting.

You're the 46th most boring person in the Western Hemisphere."

Or is it something like, "I'm an interesting person, even though most people think I'm a hopeless idiot."

(Laughter) But it's this self-assessment of being boring, this natural stupidity that really intrigues me as a psychologist.

Let me explain why

One of the most influential approaches in personality science is known as "trait theory," which maps individuals to five normally distributed scales to map out the universally manifested aspects of individual differences.

Taking the first letter, it is called "OCEAN"

O is for "open," meaning someone who is curious, and the opposite is someone who thinks conservatively.

C stands for "conscientious," or industrious, and the opposite is someone who has no motivation for life.

E is for "extroversion" extroversion The opposite of introversion

A is "agreeable", i.e. a person who is cooperative Opposition is a person who is clearly uncooperative

N is for "neurotic", someone who is nervous, and the opposite is for someone who is more calm.

All of these aspects affect our well-being and the flow of our lives.

So, for example, curiosity and diligence are very good predictors of success, whereas curious people achieve success through boldness and sometimes even bizarre behavior.

If you're a hardworking person, it's a combination of meeting deadlines, perseverance, and a certain amount of passion that leads to success.

Both extroversion and agreeableness are directly linked to good relationships with other people.

For example, I'm fascinated by extroverts.

When I teach in college, I bring up the obvious fact that it might expose the character of the student: teaching that it's practically impossible for an adult to lick the outside of their elbow.

(laughs) Did you know?

Some people have already tried to lick the outside of their elbows.

But the most extroverted among them is probably the one who not only tried it, but licked the elbow of the person sitting next to him.

(Laughter) This is an extrovert.

Let's take a closer look at extroversion, because it's important, it's interesting, and it helps us understand what I call the three temperaments.

The first is biogenic temperament, a neurophysiological quality.

The second is the social or acquired temperament, which relates to the cultural and social aspects of our lives.

The third is the traits that make you who you are as an individual, what I call your personal temperament.

let me explain

Extroverts are characterized by their need for stimulation.

That stimulation comes from finding something that excites you, like loud music, a party, a social event like TED, where extroverts come together and act like a magnet.

Kinds call friends

I saw someone like that

Introverts are more likely to spend time in quiet spaces, like the upper floors of this venue, where they can reduce stimulation.

Maybe they just realized that if they had the opportunity to reduce their stimulation, they would be better off taking advantage of it.

Sometimes the stimulus comes from inside the body.

For example, caffeine works much better for extroverts than for introverts.

When an extrovert walks in at nine in the morning and says, "Oh, I want coffee," I'm not joking, I really want it.

It's not the case for introverts, especially if the task they're working on requires them to react quickly, or it involves numbers.

but that's a misread

Now, it's really interesting to see what the difference is. People aren't always what they look like. And that's the next point.

Before we get into that, let me just say a few words about sexual activity.

So if you want to know what's ahead— uh, you want to know?

Okay (laughs)

There are several studies that have looked at how often men and women engage in activity, divided between men and women, whether they're introverted or extroverted.

So the question is, how many times in a minute -- sorry, that was a rat study -- (Laughter) how many times in a month -- an introverted male does that?

was 3.0 times

What about extroverted men?

many? Or less?

yes there are many

5.5 times, almost double the number

3.1 times for introverted women

What about extroverted women?

To be honest, from an introverted man's point of view - and I'll tell you why later - he's a heroine.

7.5 times

Not only do I deal with all extroverted men, but I've also been picking on a few introverted men.

(Laughter) (Applause) Extroverts and introverts communicate differently.

When extroverts socialize, they want to meet a lot of people and in close proximity.

Likes to communicate by standing nearby

Likes a lot of eye contact and wants to stare

Studies show that extroverted people are more likely to give people nicknames.

For example, when I met a man named Charles, I immediately started calling him "Charlie" and "Chuck," becoming "Chuckles Baby."

(Laughter) As an introvert, I keep calling myself "Charles" until the person I'm talking to gives me permission to be intimate.

I speak differently

Extroverts prefer black-and-white, concrete, simple language.

Introverts -- and let me tell you, I'm the most introverted introvert of all introverts -- speak differently.

Convoluted contexts -- lots of modifiers -- I like intentionally blurry sentences -- (Laughter) Well that's where --

(Laughter) Would you say—

(Laughter) It's not very explicit -- it's like that.

When these two types speak, sometimes they don't mesh.

I had a consulting deal that I jointly signed with a colleague.

First, my colleague's name is Tom.

different from me

(Laughter) Next, I'm 195 cm tall.

I tend not to

(Laughter) And I couldn't be more extroverted.

I'm fiercely introverted

I get overstimulated so quickly that even one cup of coffee after 3 p.m. can keep me awake at night.

A client gave me a guy named Michael.

But it nearly ruined the project.

Well, Michael's dispatcher approached me, "What do you think of Michael?"

I'll tell you what Tom said later.

It was a typical "extroverted human language"

And he interpreted what I said with his extrovert ear, which was actually quite accurate.

I said, "Well, Michael certainly has a tendency to behave at times that some might consider to be more assertive than is normally required."

(Laughter) Tom looked dumbfounded and said, "Brian, I just said that. He's a no-nonsense!"

(Laughter) (Applause) As an introvert, I can hint at certain "no-go" aspects of Michael's behavior without swearing.

(Laughter) But Tom, an extrovert, thinks, "What's wrong with calling an idiot an idiot?"

In this way, parallel lines

Now, is this something we should also consider?

of course

it's important to know

Is this all there is to being human?

Is it just a collection of traits?

It's different

Look, you're like someone else, but you're not like anyone else.

What about your personal identity?

Both Elizabeth and George share some similarities in their extroversion and neuroticism.

In your own behavior, the uniqueness of Elizabeth, the uniqueness of George, etc., rather than just a collection of characteristics, the personality that goes beyond it is transmitted.

What if you love me?

It's not because you're a certain type of person.

I feel uncomfortable classifying people into pigeon boxes.

I don't think even doves belong to boxes.

what makes us who we are

It's an activity in life — a personal project

I'm sure you're in the middle of it, and maybe no one else knows about it.

It's about your child, or you've taken him to the hospital three times and you can't figure out what's wrong.

The same is true when it comes to mothers

Uncharacteristic behavior that comes out in this kind of situation

It's called the "free property"

A very good listener can be difficult to handle when it comes to their mothers and children, like when they're stuck endlessly with paperwork at the hospital.

What are free properties?

It's about running a "script" to advance the core project at the core of your life.

this project is important

Instead of asking what type of person they are, ask them what their core project in life is.

That's where the free feature comes into play.

I'm an introvert, but my core project is teaching.

I'm a university professor

I really love my students and I really love my field.

I can't wait to share new information, exciting things, and things I really want to share.

That's why I act extroverted, because when it comes to 8:00 a.m. classes, students need a little laughter, a little hands-on class, to help them get through the rough seas of academics.

But if you're playing an uncharacteristic character for a long period of time, be very careful.

'Cause sometimes you realize you don't take care of yourself

In my case, after acting as a "pseudo" extrovert for a while, I needed a place to be alone and recuperate.

There's a chapter in Susan Kane's book, "The Age of the Introvert," about a quirky Canadian professor who was teaching at Harvard at the time, and it was about me sometimes hiding in the men's bathroom to escape the relentless attacks of violent extroverts.

(Laughter) I still remember one day, when I was withdrawing myself in a bathroom cubicle, trying to avoid overstimulation.

And then the True Extrovert came in next to me -- not in the cubicle, but in the next cubicle -- and I heard all kinds of excretion sounds.

(Laughter) And then I heard a hoarse raspy voice saying, "Hey, are you Dr. Little?"

(Laughter) If there's a surefire way to keep an introvert constipated for six months, it's talking while sitting on the toilet.

(laughs) By the way, this is where I'm going now.

Please don't follow me!

thank you

(applause)

When you're designing a new product, a new service, a new business, the only way you'll know if it's good or good design is when you see how it's actually used in context.

I am reminded of this every time I walk through Highbury Fields in north London.

in a very beautiful park

An open space covered with grass spreads out

Surrounded by Georgian style buildings

But this tread cuts across the middle

Clearly, no one bothers to walk around the perimeter.

Instead, we take this shortcut, so the shortcut naturally takes shape.

Now, this shortcut is called the Desire Path, and it's usually the easiest route.

Shortcuts are a very interesting thing, because they usually come at the intersection of design and user experience.

Here I apologize, you will find shortcuts everywhere.

I'm going to start today by highlighting three points that I think are interesting, and from there, I'd like to share with you what I think is important in launching a new product or a new service.

The first is Brasilia, the capital of Brazil.

When you look at this city, you realize that you have to design it for ease of use in order to meet a real need.

Brasilia is a great city

Designed by Niemeyer in the 1950s

It was the golden age of air travel, so as you can see in the picture, I made the city look like an airplane.

With a little concern, we put most of the major government ministries in the cockpit.

But if you zoom in on central Brasilia, you'll see that at this marked point, the Desire Path crisscrosses.

this is everywhere

The designers wanted the design to be forward-looking.

So in the future, we won't have to walk, we'll be able to drive, so we don't need sidewalks.

But as you can see, there is actually a need.

Some of the desire paths are extremely dangerous.

If you focus on the middle one, it crosses 15 lanes of highway.

It's no surprise that Brasilia has five times as many traffic accidents involving pedestrians as the average American city.

people are resourceful

Always find an easy route that saves you money and time

Not all desire passes are dangerous, something I noticed on my flight here from Heathrow.

Many people don't like being forced to walk between duty-free shops.

It's amazing how many people make a big turn to cross this duty-free shop on the right rather than taking the circuitous left aisle, using the Desire Pass.

It's an interesting question to ask: What do designers think when they see this kind of behavior?

do you think people are stupid?

Do you think people are lazy?

Or do we accept this as the only reality?

this is their product

we practically design together

We have to be comfortable designing to meet real needs, because if designers don't, we're going to make it easier for users to use.

The second Desire Path I want to share with you is at the University of California.

This shows us that sometimes the best way to create great designs is to just start.

College campuses are a good place to find Desire Paths.

Because students are always late and they are very smart.

So the students rushed to the lecture

always find a shortcut

The designers at this time knew that

So after you build a building, you have to wait a few months for the road to open up.

then paved

(Laughter) It's incredibly clever.

In fact, by starting a service with just the bare bones, you can usually find out what people really want.

For example, Boston's Air Muir was about to start a restaurant.

where do you want to be located?

what do you want on the menu?

He started a service, which is a mobile shop, and he changes locations every day.

I wrote a different menu every day on the whiteboard next to me to see what people wanted to eat.

he now runs a restaurant chain

So sometimes starting something is a very effective way to find a desire path.

The third and final desire pass that I want to share with you is the National Institutes of Health.

Here you can see that the world is constantly changing and we have to adapt to that change.

As you can imagine, this is a hospital

The sign on the left is the oncology department.

Patients usually stay at the hotel on the bottom right.

Because it's a facility for patients, the hospital provided cars for the patients.

But once chemotherapy started, the patient didn't want to get in the car.

I was pretty nauseous, so I walked back to the hotel.

This diagonal Desire Path was created.

Patients have dubbed this path the "Chemopathy Trail."

At first, the hospital tried to ignore it by re-grassing it.

But after a while, they realized that this road was important and needed, and the hospital paved it for their patients.

I think our job is sometimes to pave the finished desire path.

Back in North London again, the Desire Path didn't exist before.

This road was created because there's a huge Arsenal stadium, and on match days, a lot of people pass through it from the subway station on the bottom right.

There's a Desire Pass in the park on the bottom right

If you go back in time a few years, there was no desire pass during the construction of the stadium.

Our job is to wait for the desire bus to come up and pave the right place, like someone did at the site in this picture.

Someone put up a fence, but people started to go around in front of them, and someone put up the paving stones.

(Laughter) And this picture also shows that the world is in flux.

It's constantly changing, because you can see another desire path on the other side of this picture.

If you look at the three desire paths I've shown you, you can see that they need to meet the needs of real people.

Empathizing with the needs of users will be the number one guiding principle for business success.

Design to meet real needs and be easy to use, because if you design hard to use, someone else, usually the user, will change it to make it easier to use.

Second, starting is often the best way to find out what people really want.

The answer is rarely found inside a building.

Go out and see what people really want

Finally, partly because of technology, the world is very fluid right now.

it's always changing

Desire paths like this are happening faster than ever before.

Our job is to pick the right desire path and pave it.

thank you

(applause)

Every weekend for as long as I can remember, my father would wake up on Saturday mornings in his worn-out work clothes and take the helm of our rickety old house, scraping the paint off the walls.

I wouldn't even call it a restoration, but more like a cleansing ritual.

It would take him a year, with a heat gun and a scraper, to strip the paint off, repaint it, and start again the next year.

Stripping and stripping and painting and repainting, the maintenance of that old house was never ending.

The day my father turned 52, I got a call.

It was from my mother, and at the hospital, they found a lump in my father's stomach, and told me it was terminal cancer and that he had three weeks to live.

I immediately went to my parents' house in Poughkeepsie, New York, to be with my dying father — not even knowing what the next few days would be like.

To distract myself, I rolled up my sleeves and set to work restoring our old home that my father could no longer finish.

The end of the three-week deadline was approaching and then passed, but my father was still alive.

Three months later, my father joined the work.

I stripped the inside and repainted it.

Half a year later, the window part was finished. A year and a half later, we finally replaced the decaying porch.

Standing there beside me, my father, looking contentedly at the day's work. My hair had grown back and my symptoms had completely subsided. My father turned to me and said, "Hey Michael, this house saved my life."

So the next year, I decided to go to college to study architecture.

(Laughter) But the architecture you learn in college is very different.

It seemed that people who created buildings with novel forms, such as ribbons, were recognized.

Are these pickles?

(Laughter) I guess it's meant to be a snail.

I didn't understand

The best architects, the most amazing architecture, beautiful, visionary, innovative, why are there so few and so few people serving?

And even more so, isn't there more you can do with your creative genius?

Just before the final exams began, I took a break from all-night studying and went to listen to a lecture by Dr. Paul Farmer, who works to improve health for the world's poor.

I was astonished to hear him talk about architecture.

They say that buildings are making people sick, especially among the world's poorest, and that it's causing epidemic-like problems.

In this South African hospital, a patient who walks into the hospital with a broken leg is forced to wait in an unventilated hallway and leaves with multidrug-resistant pulmonary tuberculosis.

People are dying because even the simplest mechanisms to prevent infection are not considered.

"Where are the architects?" he asks.

If hospitals make people sick, where are the architects and designers who can help build hospitals designed to heal people?

That summer, my friends and I were driving a Land Rover through the rolling hills of Rwanda.

I spent the next year in an old lodging house in Butaro, which had been used as an internment camp after the Rwandan genocide.

So I worked with Dr. Farmer's team to design and build a new type of hospital.

If hallways are making patients sicker, why don't we move the hallways out and encourage people to walk outside?

If mechanical devices aren't working properly, why not design them to allow for natural airflow? You can reduce your impact on the environment

What about the patient's experience?

We know that just having a view has a huge positive impact on patients, so what if we designed a hospital so that every patient could have a view out the window?

With a simple design that fits the place, you can create a hospital that heals people.

I've learned that designing it and building it are two very different things.

I worked with a brilliant engineer, Bruce Nizei, and his way of thinking about construction work was very different from what I learned in school.

We had to excavate a broad crest of a hill, but bulldozers were expensive and hard to get to the site. Bruce suggested digging by hand, in a technique called "ubdehe" in Uganda, which means "local action for the community."

Hundreds of people came together with shovels and hoes to dig in half the time and at half the cost of using a bulldozer.

Instead of importing furniture, we created a guild so that everyone could learn how to handcraft furniture from a master craftsman.

And in the same place where the Rwandan genocide happened 15 years ago, Bruce insisted on including people of all backgrounds, half of whom were women.

Bruce used this process of building to heal, not just for the sick, but for the whole community.

This approach, which we call Lo-Fab, has four pillars: adopt locally, source locally, nurture people when they can, and most importantly, treat every design decision as an opportunity to honor the pride of a place.

It's like a building version of the local production for local consumption movement in agriculture.

I believed that this method could be adopted anywhere in the world and would change the way we talk about and evaluate architecture.

In local architecture, even aesthetic choices can be designed in ways that affect people's lives.

In Butaro, we decided to use the abundant volcanic rock, which was considered a nuisance by farmers and piled up on the side of the road.

We worked with stonemasons to cut those stones and build the walls of the hospital.

We started at this corner, and when we went around the hospital, they were very good at putting stones together, and I asked if they could tear down the original wall and rebuild it.

see what they can do

it's amazing

To me, this is beautiful because I know that these stones were hand-cut and assembled into thick walls, made only here, using local stones.

When you go out today and look around at a building, ask not only what is its environmental footprint, but also what is the handprint of the person who built it.

We've started new practices around this question and tried them all over the world.

In Haiti, I asked myself if a new hospital could help end the cholera epidemic.

We designed this 100-bed hospital with a simple strategy of decontaminating infected medical waste to keep it from contaminating groundwater, and our partner, the GHESKIO center, is already saving lives with it.

In Malawi, I asked myself if birthing centers could dramatically reduce maternal and child mortality.

Malawi has the highest maternal and infant mortality rates in the world.

Using a simple strategy that can be replicated across the country, we designed an attractive birthing center to help pregnant women and their attendants arrive early and have a safe delivery.

In the Congo, I asked myself if the education center could also be used to protect endangered wildlife.

Poaching for ivory and meat has led to global epidemics and conflicts.

In one of the most inaccessible places in the world, we built a center to show how we can use the mud and wood around us to protect our rich biodiversity.

I asked myself to rethink the world's largest university for the deaf, even here in the United States.

The deaf community has shown us the power of visual communication through sign language.

We've designed a campus that opens our eyes to how we as humans communicate, verbally and non-verbally.

In my hometown of Poughkeepsie, I thought about old industrial infrastructure.

We wanted to see if art, culture and design could rejuvenate this town and other cities in the declining steel belt and turn them into centers of innovation and growth.

For each project, we asked a simple question: "What more can architecture do?"

By asking that question, I forced myself to think, How can I create jobs? How can we make the most of local produce? How can we honor the pride of the communities in which we work?

I learned that architecture can be a force for change.

About a year ago, I stumbled across an article about Brian Stevenson, a dynamic, courageous and leading human rights activist.

(Applause) Brian had a bold vision for architecture.

Brian's team has documented more than 4,000 African-American lynchings in the southern United States.

We're planning to mark every lynching county and build a national memorial for lynching victims in Montgomery, Alabama.

Countries like Germany, South Africa, and Rwanda have realized the need to create memorials to their past atrocities to heal their national spirits.

America hasn't done that yet.

So I wrote a pitching email to the Fair Justice Initiative, and Mr. Brian, I think your construction project is the most important thing we can do in America, and it can change the way people think about racial injustice.

Don't you know who will be in charge of the design?

(Laughter) To my surprise, I got a response from Brian himself, inviting me to meet and talk with his team.

Needless to say, I canceled all my plans and jumped on a plane to Montgomery.

When I got there, Brian and his team picked me up and showed me around town.

He pointed me to historical events scattered throughout the city, including many Confederate-related and a few slave-related ones.

Then he was on a hill overlooking the town

took me

He points out a river and railroad tracks that once thrived on America's largest domestic slave-trading port.

And then George Wallace stood there, pointing to the capitol dome where he had declared "perpetual segregation."

Then he pointed to the very hill we were standing on and said,

"I want to build a new memorial here that will change the identity of this town and this country."

Over the past year, our two teams worked together to design that memorial.

The architecture of the cenotaph — takes us through familiar architectural styles like the classical Parthenon and the Vatican colonnade.

As you walk in, you realize that the ground is going down, your vision changes, and the pillars remind you of lynchings in public places.

As we move forward, we begin to understand the existence of many souls who are still at rest.

The name is engraved on the tombstone that hangs overhead.

Identical stone monuments are lined up outside

This stele is a temporary awaiting cleansing and is to be placed in the county where the lynching occurred.

Over the next few years, this site will bear witness through grave markers being placed in each county.

Our country will begin to heal from over a hundred years of silence.

When we thought about how to build this, we were reminded of the building process we learned in Rwanda, ubdehe.

We wondered if we could fill the pillar with dirt from the spot where the killing took place.

Brian's team began collecting soil from the site, placing it in jars and preserving it with family, community representatives and descendants.

The very act of collecting dirt led to a kind of spiritual healing.

This is an act of restoration of fairness.

As one member of the Initiative wrote while collecting dirt from the spot where Will McBride was lynched, "I pray that if Will McBride had a drop of sweat, a drop of blood, or a single pore left, I dug it up and now his body is at rest."

Construction on the memorial is slated to begin later this year, and it will be the place to finally tell the story of the unspeakable act that left its mark on this country.

(Applause) When my father said that our home saved his life, what I didn't realize was that he was talking about our deep connection to architecture.

Architecture is not just expressive statues.

Architecture makes our personal and collective aspirations visible.

Good architecture gives us hope

Good architecture can heal

thank you very much

(applause)

I lead a team at Google working on machine intelligence, the technology that allows computers and devices of all kinds to function like the human brain.

Professionally, we're interested in how the human brain works, in neuroscience, and particularly in areas where the brain is still far superior to computers.

One area that has long been recognized as such is perception, the process of transforming things that exist in the outside world, things like sounds and images, into mental concepts.

It's an ability that's inherent in the human brain, but it's also useful for computers.

For example, my department is working on a machine perception algorithm that allows you to search for images in Google Photos based on what you see in them.

On the other hand, the opposite of perception is creativity, which is the bringing of concepts into the world in some way.

In our work on machine perception over the past year, we've seen an unexpected connection to the world of computer creation, machine art.

I think Michelangelo had the foresight to see this dual relationship between perception and creation.

He famously said, "In every block of stone there is a statue, and the sculptor's job is to find it."

What Michelangelo realized was that we create by perception, and perception itself is the act of imagining, it is creative.

The brain is, of course, the organ of thought, perception, and imagination in the human body.

So let's take a quick look back at the history of brain science.

Because unlike things like the heart and intestines, the brain is often invisible to the eye, at least not to the naked eye.

Early anatomists who looked at the brain looked at the external structure of the brain and gave it clever names, like the hippocampus, which is the seahorse.

But the name so given tells us very little about how it works.

I believe that the first real insight into what was going on in the brain came from the great 19th-century Spanish neuroanatomist Santiago Ramón y Cajal, who used the microscope and special dyes to selectively stain individual cells in the brain in such a clear way that the morphological understanding began.

In the 19th century, his image of nerves was something like this.

this is a bird brain

There's this amazing variety of cells, and the cell theory itself was quite new at the time.

This structure, this cell has dendrites, which can grow very long, which was also a novelty at the time.

dendrites look like wires

This may have been self-evident to some in the 19th century, when the electrical revolution was taking place and wiring was beginning to become pervasive.

But in many ways, the microanatomical picture presented by Ramon y Cajal is still in some ways not surpassed.

A century later, we're still trying to complete the work that Ramon y Cajal started.

This is raw data from the Max Planck Institute for Neuroscience, with which we partner.

What they did was visualize small pieces of brain tissue.

The entire sample is one cubic millimeter in size, and what I'm showing you right now is just a small portion of it.

The left bar is one micron long.

The structure you see here is a mitochondria, which is about the size of a bacterium.

It shows serial cross-sections of tiny pieces of tissue.

For comparison, the average hair diameter is about 100 microns.

What you see here is much smaller than the diameter of a human hair.

A 3D image of a neuron can be reconstructed from serial cross-sectional images obtained by such an electron microscope.

here as Ramon y Cajal did

Only a few neurons are shown, otherwise they would be too dense.

It's bewildering, because neurons are interconnected -- very complex structures.

Ramon y Cajal was ahead of his time, and our understanding of the brain progressed slowly over the decades that followed.

Eventually, it was discovered that neurons used electricity, and by World War II, technology had progressed to the point where electrical experiments could be performed on living neurons to understand how they work.

Around the same time, computers were also invented, based on the idea of ​​modeling the human brain, which Alan Turing, one of the fathers of computer science, called "intelligent machines."

And then Warren McCulloch and Walter Pitts turned to Ramon y Cajal's diagram of the visual cortex, which is what I'm showing you right now.

This is the cortex that processes images received from the eye.

To them, this looked like a circuit diagram.

There are many mistakes in the details of McCulloch and Pitts' schematics.

The basic concept, that the visual cortex acts like a series of computational elements that relay information in stages, was essentially correct.

I want to take a moment to explain what visual information processing does.

The basic job of perception is to look at images like this and make a distinction, like, "That's a bird."

It's a hard problem for computers, and until a few years ago it was nearly impossible.

Traditional computer architecture is ill-suited for this task.

Between the pixel image of the bird and the word "bird" is a series of interconnected neurons in a neural network.

This neural network exists biologically within the visual cortex and can now be modeled on computers.

let me show you how it works

The image shows the first layer of neurons, which is the visual equivalent of neurons in the retina.

Information is passed from one layer of neurons to another, and neurons are connected by synapses with different weights.

The behavior of this network depends on the strength of the synaptic connections,

that determines the computational characteristics of the network

So, eventually, a small group of neurons will respond and perceive it as a "bird."

Now let's say that we have three objects - the input pixels, the "birds" that are the synaptic outputs in the neural network.

x is the pixel in the image, so there are about 1 million

w is billions to trillions, representing the strength of all synapses in the neural network.

The output from this network, the number of y's, is very small.

"bird" is only 4 letters, right?

Now suppose that the following simple formula holds: x "x" w = y

I put quotes on "multiply" because the operations performed in this scene are actually very complex mathematical calculations.

there is one equation

there are 3 variables

As you know, if you know the values ​​of two of the three variables, you can also find the values ​​of the remaining variables.

So the problem here was to infer that it's a bird from a picture of a bird, which means we don't know y, but we know x and w.

An image x and a network w are given

As you can see, it's a relatively simple problem.

Multiply 2 and 3 and you'll get the answer

A neural network we recently built does exactly this.

We're doing real-time processing on our phones, and the reason we're able to do so much is that today's phones can execute billions or trillions of instructions per second.

What you're seeing here is a series of pictures of birds on a cell phone, and a neural network that not only says, "This is a bird," but also identifies the type of bird.

In this equation, x and w are known and y is unknown.

I skipped over the difficult part here.

How do humans learn?

This learning process, the problem of solving w, is that if the variables are simple expressions with numbers, then we know what to do.

The problem here is this operator

I just did division because division is the inverse of multiplication.

In fact, it's a very complex non-linear operation with no inverse.

So we have to solve this without using the division operator.

But it's not that hard to do

We're going to use a little algebraic trick.

still using multiplication

And consider the "0" on the left side to be the error

So if you get w correctly, the error value will be 0.

If the value of w is incorrect, the error is greater than 0

It makes a guess that minimizes the error value.

What about w=0 as a first guess? error is 6

When w=1, the error is 4

In a Marco Polo-style tag tone

Bring the error closer to 0

Then we find the approximate value of w

Usually, we never get to the exact correct answer, but after doing it dozens of times, we get something close enough, like w = 2.999.

this is the learning process

Again, remember, what we were doing was, given x and y, we used an iterative process to find the value of w in the middle.

This is the same way humans learn things.

When I was a baby, I was shown a lot of pictures and told, "This is a bird, this is not a bird."

By repeating this learning, we solve for w and create neural connections.

Finding y given x and w is a fast, everyday "perception."

I just thought about how to find w, but that's learning, which is much harder, because you have to minimize the error over a lot of training examples.

About a year ago, my team's Alex Maudvintsev decided to do an experiment to see what happens when we find the value of x given known values ​​of w and y.

In other words, what would a "picture of a bird" look like when a neural network trained on a bird answers that it's a bird?

It turns out that the same error minimization procedure that we use to train networks to recognize birds can work in this case as well.

a kind of bird painting

Here's an image of a bird generated by a neural network trained to recognize "birds."

Let me give you another interesting example.

It was made by Mike Taika from my group, who called it "Animal Parade."

It's reminiscent of the work of William Kentridge, who sketches and erases and draws and erases to create animation.

In this case, Mike uses a network designed to identify animal species by varying the value of y within a set of animal species.

Like Escher's trompe l'oeil, animals morph into other animals.

Next up is Mike and Alex working together to try to fit y into a two-dimensional space, creating a map of the space that includes everything the network sees.

By doing this image synthesis and image generation across the screen, varying the value of y, you get a map like this, a visual map of everything the network sees.

All kinds of animals appear.There's an armadillo over there.

You can do something similar with other networks

This is a network designed for face recognition, to identify human faces.

where y is "I" with my face as a parameter

If you use this network and find the value of x, you get a pretty crazy image. It's kind of cubist, it's kind of surreal, it's kind of psychedelic.

The reason multiple viewpoints are united in this way is that the network is designed to be disambiguating: the appearance of a person's face changes depending on the viewing angle, it changes depending on how the light hits it.

So when you're doing a reconstruction like this, without a guide image or statistics, there's confusion about perspective, because there's ambiguity.

Here, I'm using the footage of Alex's face as a guide in the optimization process that reconstructs my face.

not perfect

There's a lot more that can be done to improve this optimization process.

For now, using the face as a guide will help you create a coherent image.

You don't have to start with a blank canvas or white noise.

If you want to find x, you can start with some other image as x.

Let me show you a demo that illustrates it.

This is a network designed to classify anything, man-made or animal.

We start with this picture of clouds, and when we optimize it, the network looks for, "What can you see in the clouds?"

As you stare at the screen, you can see various things in the clouds.

And if you use a facial recognition network for this, you'll end up with a hallucinogenic image that's going to drive you a little crazy.

(Laughter) Mike is also doing another experiment with this image of the cloud, as he repeatedly hallucinates and zooms.

Like this, you can create a fugue-like, free-association-like image out of this network, and the network is eating its own tail.

Each image is the basis for the next image, "What do you see next?

what do you see next? what do you see next? "

By the way, this demo was first shown at a conference called "Higher Education" in Seattle, shortly after marijuana was legalized.

(Laughter) As a final summary, I'd like to point out that this technology is not limited to what I've shown you.

I just gave you a visually interesting example.

It's not really visual technology.

In an experiment by our collaborator, artist Ross Goodwin, he takes a picture with his camera, and a computer on his back writes a poem based on the contents of that picture with a neural network.

A poetry neural network is trained on a vast corpus of 20th century poetry.

Why do you think poetry written in that way is not so bad?

(Laughter) So, in conclusion, I really think Michelangelo was right. Perception and creativity are intimately connected.

The neural network I showed you earlier was trained to distinguish different things in the world, but you can also reverse the process and create new things.

And it makes us realize that Michelangelo wasn't the only one who could see a sculpture in a block of stone. Any living being, any being, even an extraterrestrial being that has the ability to perceive can also create, because both can be done by the same mechanism.

And perception and creation are by no means limited to humans.

We're starting to build computer models that can do that.

Not surprisingly, the brain is also a computing machine.

Finally, computing begins with the design of intelligent machines.

It was modeled from the idea of ​​how machines can become intelligent.

Now we are finally realizing the world that our early pioneers dreamed of, the dreams of Turing and von Neumann, the dreams of McCulloch and Pitts.

Computing isn't just about accounting or playing Candy Crush.

Computers were originally modeled after the human brain.

It can be used both to better understand human intelligence and to extend human intelligence.

thank you

(applause)

Two weeks ago, when I searched for "nationalist" on Twitter,

"Racist idiots on the rise" (Laughter) "White supremacist idiots" "Fascist puppets" (Laughter) "Surveillance socialists, authoritarians, horrible."

And if you search for "globalist," you'll find "socialist traitor," "bad corporate propaganda," "elitist financial mogul," and "rootless urban scum."

(Laughter) Even if you're basing it on social media, it sounds like a really bad thing to say.

It's the flip side of the seriousness of one of the root problems of our time: nationalism or globalism, which one to choose?

This affects everything: your cultural identity, your ability to thrive, your political system, your global environment, everything.

what is nationalism

The definition in the dictionary is "loving one's own country" or the principle of prioritizing national interests over international considerations.

For nationalists, the foundation of modern society is the state. We share our land, our history, our culture, and help each other.

I believe that nationalism is the only way to stabilize society in this vast, chaotic world.

But globalists warn that selfish nationalism is dangerous.

For example, fascism in the twentieth century, there were horrific wars, great human casualties, unfathomable destruction.

On the one hand, globalism

The dictionary defines it as "the planning and execution of global economic and foreign policy."

For nationalists, globalism is the destruction of what our ancestors spent decades building.

It is equivalent to insulting the spirits of the heroes, undermining the unity of the country and inviting foreign aggression.

But globalists argue that stronger global governance is the only way to solve supranational problems, such as the proliferation of nuclear weapons, the global refugee crisis, climate change, terrorism, and even the explosive progress of superhuman AI.

We are at a crossroads and we have to choose: nationalism or globalism?

Having lived on four continents, this has always bothered me.

But there was an event that changed everything: the biggest surge in nationalist votes in a Western democracy since World War II.

It was so sudden I can't explain it in theory

Because of the ideas that these political trends spread, I might lose my French citizenship one day because I'm of North African descent, and I might not be able to go back to America because I'm from a predominantly Muslim country.

To live in a democracy is to live with the belief that the government will protect you, as long as you follow the laws.

With the rise of nationalist populism, no matter how good a citizen I am, I have to live in fear that the government can force me to live a hard life for reasons beyond my control.

I can't help but feel uneasy

But here I was forced to think, and I tried to think more deeply about this problem.

The more I thought about it, the more questions grew

Why should we choose between nationalism and globalism? Can you choose between loving your country and caring for the world?

you don't have to

You don't have to choose between your family and your country, between your religion and your country.

We already coexist peacefully with multiple identities.

Why should we choose between the country and the world?

Instead of making this dicey choice, why not confront the dangerous idea of ​​one or the other?

I would like to ask all of you globalists out there, what do you think of the word "nationalist"?

Like this?

okay me too

I just want you to remember that for a lot of people, it's really like this.

or this

It's up to you. When you happen to see the Olympic minors on TV, (Laughter) wait -- you're going to be super excited to see footage of a stranger wearing your country's flag.

My heart is pounding and I can't stand it anymore I stand up in front of the TV and scream as hard as I can to cheer on the players

that's nationalism

People who feel happy in solidarity, happy in belonging to the community of their country.

Is that wrong?

For globalists, nationalism may be an outdated and fading concept.

but unfortunately it is wrong

The World Values ​​Survey surveyed more than 89,000 people in 60 countries How proud are they of their country?

Nationalism is still alive

Other research shows that nationalism is an intense feeling that is closely related to individual well-being.

Your happiness depends on the prosperity of your country, not your income, your job satisfaction, your health, as you might imagine.

If nationalism can make you happy, why deny it?

Maybe some of you fellow globalists, like me, support globalization on a humanitarian basis.

Or perhaps they are satisfied with the achievements achieved after the war.

Much of the world is more peaceful than it's ever been, global poverty rates continue to fall, and more than two billion people, especially in Asia, have made impressive strides in improving their living standards.

But research shows that globalization also has a negative side.

Some people have been left behind, hundreds of millions of middle-class Westerners, stagnant incomes for 20+ years, depending on research, maybe 30+ years.

can't ignore this problem

Let's gather our energies to tackle this problem of globalization, instead of fighting divisive battles against nationalism.

Nationalists, I'm going to give you a little sermon.

(Laughter) What does "globalist" mean to you?

1% privileged millionaire?

(Laughter) A cold, greedy Wall Street type?

Someone with multiple roots living in a huge cosmopolitan city like me?

Do you remember the investigation we talked about earlier?

Another very interesting discovery was that 71 percent of the people in the world agreed, "I am a citizen of the world."

in short?

We're proud to be citizens of the world, not just our country.

even better

People who consider themselves citizens of the world are more proud of their country than those who do not consider themselves citizens of the world.

So being a globalist isn't about betraying your home country.

It means that you can empathize with society enough that it is projected across borders.

Given the nationalist feeling in me, my concern about the global world is our national identity: what makes us different, what makes us different, how do we protect what makes us united?

And it struck me, strangely, that many of the factors that determine national identity come from outside our borders.

For example, commonly used characters

Actually, the Latin alphabet that we use dates back thousands of years, near the Nile River.

It all started with a cow like this The cow became a beautiful hieroglyph

This hieroglyph became aleph by the Semites of the Sinai Peninsula.

He traveled with the Phoenicians and ended up on the Greek coast where he became alpha, the origin of the letter "A."

This is how the Egyptian cow became A.

(Laughter) Similarly, the house in Egypt went from bet to beta to B.

Egyptian fish became dalet → delta → D

Our texts are full of Egyptian cows, houses and fish.

(Laughter) There are many examples.

Consider the British monarchy

Elizabeth II?

German ancestry

Britain's coat of arms is

All written in French

The Eiffel Tower, an icon of France

Where did you come from?

United States — Not Las Vegas, but 19th Century New York

(Laughter) This was the tallest skyscraper in New York in the 19th century.

They look alike, don't they?

You might think China is its own civilization Surrounded by the Great Wall

but think carefully

What is China's ideology?

Marxism born in Germany

one of the major religions?

Buddhism originating in India

What is Indian's favorite pastime?

cricket

In the words of Indian scholar Ashish Nandi, "Cricket is a game of Indian origin that was accidentally discovered by an Englishman."

(Laughter) And as you can see from all of this, what gave birth to the traditions of many countries actually came from the globalization that happened long ago.

Not only letters, but many of our national traditions wouldn't exist without globalization.

What suddenly comes to mind is the traditional Italian cuisine that is loved all over the world

If you happen to go to a real Italian restaurant and it's all about ancient Roman cuisine, you better go home.

(Laughter) I'm disappointed.

No spaghetti or pasta, because it originated in Sicily, which was under Arab rule in the 8th century.

No good espresso, no creamy cappuccino, because they came from Abyssinia through Yemen in the 17th century.

No Neapolitan pizza, of course — how can you make one without the tomato that originated in the Americas?

Maybe instead you'll get a lot of porridge, full of cabbage and cheese, and if you're lucky, you'll get the best delicacy of the time: fat dormouse.

(Laughter) Luckily, it's not a closed tradition guarded by fanatic guardians.

It evolved under the influence of explorers and traders and home cooks who were open.

In many ways, globalization is an opportunity for national traditions to be questioned, reworked and reinterpreted, to slowly embrace change and remain vibrant and present.

Remember, most of the nationalists in the world are globalists Most of the globalists in the world are nationalists

Many of our favorite homeland traditions came from beyond our borders.

The reason why I want to jump outside the border is because I want to experience foreign traditions

So the real question is not to choose between nationalism and globalism.

How can I successfully do both?

Complex agendas in a complex world require creative, non-binary solutions.

What are you waiting for?

that's all

(applause)

Sources about the ancient Egyptian king Thutmose III describe a wonderful alien bird that "lays its eggs daily."

The Romans took this bird with them during campaigns as a predictor of victory or defeat.

Today, chickens still play an important role, but not in a position of worship, but on the table.

Modern chickens are largely descended from a bird called the red jungle fowl and three closely related species that are partly endemic to India and southeast Asia.

The bamboo that grows in this area produces a large amount of fruit only once every few decades It produces a large amount of fruit only once every few decades

The red jungle fowl's daily egg-laying ability may have evolved to take advantage of this rare feature of bamboo to increase populations when food was plentiful.

This characteristic of chickens is used by humans on a daily basis, and the chicken's poor flight ability and the fact that it doesn't need a lot of space to keep it makes it easier to catch and confine it.

The earliest domesticated chickens date back at least 7,000 years, and were not kept for food, but used for things that today would be considered objectionable.

Cockfighting became a popular entertainment due to the ferocity of breeding season roosters with talons as weapons

By 2000 BC, the chicken had spread from the Indus Valley to China and the Middle East, reigning as the king of animals and being used in religious ceremonies.

But in Egypt, a new history of chickens begins.

While she's incubating, she doesn't lay new eggs and sits "grabbing" six or more eggs for 21 days.

By the middle of the 1st millennium BC, the Egyptians had discovered a way to artificially incubate chicken eggs by placing them in baskets and placing them on hot ashes.

This freed the hen from having to incubate eggs every day, and it went from being a noble, ceremonial existence to being a common food.

When the Egyptians discovered how to artificially incubate eggs, Phoenician traders brought the chicken to Europe, where it quickly became an integral part of European livestock.

But for a long time, the noble chicken continued to exist alongside the edible chicken.

The ancient Greeks used the fighting rooster to demonstrate fighting spirit to young warriors.

Romans asked chickens for oracles

And by the seventh century, the chicken was a symbol of Christianity.

Over the next several centuries, chickens accompanied humans wherever they migrated, spreading around the world through trade, conquest and colonization.

After the Opium Wars, Chinese chickens migrated to Europe and mingled with European chickens.

A craze began, known as "Hen Fever" or "The Fancy," as poultry farmers across Europe bred chickens with specific characteristics to create a variety of new breeds.

This trend even caught the attention of Charles Darwin, who wondered if similar selective breeding was happening in nature.

Darwin must have observed hundreds of chickens as he worked to complete his historic book that would popularize the theory of evolution.

But the chicken's greatest scientific contribution came later.

In the early 20th century, three British scientists conducted extensive cross-breeding of chickens based on Gregor Mendel's genetic studies.

The high genetic diversity, the many distinguishing traits, and the fact that generations change in as little as seven months, made the chicken a perfect research subject.

This research led to the invention of the famous "Punnett's Square", which tells us what genotype would result from a given pair of genotypes.

Since then, many new breeding experiments have been carried out, resulting in chickens that are bigger, fatter and lay more eggs than ever before.

In the meantime, chicken production has evolved into an industrial, factory-like business model, where chickens can be raised in a space less than a sheet of paper.

Today, due to animal rights and environmental concerns, the trend has shifted to free-range chickens, but in most countries, 22 billion chickens are currently raised on poultry farms.

From warriors and offerings to the gods to traveling companions and research objects, chickens have served a variety of functions over the centuries.

As the saying goes, "Which came first, the chicken or the egg?" But the fascinating history of the chicken, apart from what came before it, also speaks to the history of us humans.

One star in a certain place

-- like anything, it was born, grew to about 30 times the mass of our sun, and lived for a very long time.

No one knows exactly how long

Like all living things, this star will end its life and burn out the core of its heart.

it doesn't end there

As it transforms into a supernova, it releases an enormous amount of energy in the process, making it the brightest star in the galaxy, with as much energy in one second as the Sun radiates in ten days.

Supernovae play another role in the galaxy.

Supernova explosions are very large

Supernova explosions that emit gamma rays are even more intense.

In the process of becoming a supernova, its interior is crushed by its own mass and it begins to spin faster and faster, like an ice skater pulling his hand against his body to spin.

It spins faster and faster, making the magnetic field stronger.

The surrounding matter is swung around as it rotates, and the energy generated by the rotation is given to the surrounding matter, making the magnetic field even stronger.

Supernovae with these extra energies are among the brightest in the galaxy in terms of their brightness and gamma-ray emissions.

Such stars are known as magnetized stars.

For reference, the magnetic field strength of a magnetized star is a trillion times stronger than the Earth's magnetic field.

The reason the most energetic event ever observed in astronomy is called a gamma-ray burst is because this burst or explosion is most intensely measured in gamma rays.

Gamma-ray bursts are observed when a star like this, which later becomes a magnetized star, emits the most energy as it goes into a supernova.

Gamma-ray bursts are among the most intense physical phenomena observed by astronomers, yet invisible to the naked eye.

We are studying gamma ray bursts in other ways.

because you can't see it with the naked eye

Humans can see only a very small portion of the electromagnetic spectrum, called visible light.

Others need technology

But since we astronomers study more than the visible spectrum, we resort to other methods.

it looks like a slide

Slides in one plot

Photometric curve

Plot of luminosity over time

is the gamma ray light curve

Visual astronomers rely on plots like this to measure how the luminosity changes.

On the left you can see the luminosity without the burst, and on the right you can see the luminosity during the burst.

When I started working in astronomy, I could see plots like this.

i lost my sight

The disease progressed to the point where I lost my sight completely, and with it the opportunity to see this plot, to study the physics.

It was a huge turning point for me in many ways.

There was no way for me to continue doing scientific research as a profession.

I wanted to study this high-energy light and explore its astrophysical causes.

The wonders and excitement of the universe, I wanted to experience the joy of observing such magnificent celestial phenomena.

I thought about it a lot, and then suddenly I realized that the light curve is just a table of numbers turned into a plot.

Working hard with my collaborators, I was able to translate those numbers into speech.

With access to data, I can now use sound to study physics at the highest level as an astronomer.

What people have done for hundreds of years with sight, now I do with sound.

(Applause) Listen to the gamma ray bursts you're seeing on the slide right now... (Applause continues) Thank you.

When I listened to the gamma ray burst that you're seeing on the slide right now, I heard something else besides a distinct explosion.

I'm going to put on a burst sound from now on

it's not music it's a burst sound

(digital beep) This is scientific data translated into sound, mapped to intervals.

It's called the sonification process.

As I listened to this, I heard something else besides the distinct bursts.

If you look at that strong low frequency -- the baseline, but zoomed in on that baseline --

We noticed resonances characteristic of charged gases like the solar wind.

hear what i hear

You'll notice a sharp drop in volume

Because you can see it, the red line shows the luminosity converted to sound.

(Digital hum and whistling sound) Please ignore the whistling sound as it is a frog in our house.

(Laughter) (digital hum and whistling) I think you heard it.

From this, it was detected from changes in volume that the emission from the burst lasted longer and that the energy exchanged between the excited particles gave rise to resonant waves.

Remember when I said that matter around a star is swung around?

It propagates energy with an electromagnetic field distribution determined by frequency and dimension

Remember the story about supermassive stars? It would become a magnetized star with a very strong magnetic field.

If this is the case, then something from exploding stars might be related to gamma-ray bursts.

in short

Supernova explosions may play an important role in the birth of stars.

After listening to the sounds of gamma-ray bursts, what we noticed was that using sound as an aid to visual display would allow sighted astronomers to extract more information.

At the same time, by analyzing numbers from other astronomical telescopes and measurements from my own experiments, and using sound to aid the visual display, we can extract more information from the datasets we've made accessible.

The ability to translate data into sound has given astronomy the power to make big changes.

It's very encouraging to know that the field of astronomy, which has traditionally relied on vision, can be improved to be accessible to anyone who wants to understand the universe.

When I became blind, I realized that I could not receive information in the same way, in terms of quality and quantity, as a sighted astronomer.

But when the articulation technology started to take hold, I regained hope that I could contribute again in a field that I had previously worked so hard as a member of.

Access to information is important, but it's not just about astronomy.

The current situation is not keeping pace with progress across many scientific disciplines.

Bodies change. You never know when someone will become disabled.

Take, for example, a scientist who is already at the top of his career.

What if they become disabled in some way?

Do you feel alienated like I do?

The world has developed thanks to information access

Now everyone has an equal opportunity to express their abilities and decide what kind of work they want to do, not by their disability but by their interest.

By removing the limits of opportunity given to people, it leads to a sense of personal fulfillment and a richer life.

Using sound in astronomy is part of that, and it helps us contribute to science.

On the other hand, many countries say that developing perceptual technology to study astronomical data has nothing to do with astronomy, because there are no blind astronomers.

Now I work in the Astronomy Promotion Office at the South African Observatory.

So we're working on sonification technology and analytics to motivate students at the Athlone School for the Blind.

Students will learn radio astronomy, sonification techniques, and astronomical phenomena such as the massive energy release from the Sun and coronal mass ejections.

Learning with them -- who have multiple disabilities and have their own way of dealing with them -- learning with them has a direct impact on how we approach our professional work.

Let me say this is progress

this is happening now

science is for everyone

It's for everyone, so it should be accessible to everyone. We're all born with an explorer's mind.

If we don't bring people with disabilities into science, we're going to cut people's ties to history and society.

I dream that scientific research will become a common place where people can respect each other, teach each other how to fight, and make new discoveries.

I believe there will be a spectacular burst of knowledge if people with disabilities are accepted into science.

(Digital Beep) That spectacular burst.

thank you

thank you

(applause)

A tired man named Estragon sat in front of a tree at dusk and struggled to remove his boots.

Then my friend Vladimir comes and reminds my struggling friend that he must wait here for a man named Godot.

And so they start arguing at length, When is Godot coming? why are you waiting for him? Is the place right in front of this tree?

After this, "Waiting for Godot" gets weirder, but it's supposed to change the nature of modern theater, but it's supposed to change the nature of modern theater.

Written between 1949 and 1955 by Samuel Beckett, it poses a simple yet disturbing question: What should the characters do? and

(Estragon) Let's do nothing, it's safer

(Vladimir) Let's see what you say

(Estragon) Who?

(Vladimir) It's Godot.

(Estragon) That's good

These cryptic dialogues and circular arguments are the hallmarks of theater of the absurd, a post-World War II movement in which artists struggled to find meaning in devastation.

The absurdist theater writers deconstructed plots, characters, and lines, re-questioned their meanings, and shared a profound sense of uncertainty on stage.

It sounds scary, but the absurdity lends humor to helplessness.

This is reflected in Beckett's peculiar subtitle of Waiting for Godot, which he calls "a two-act comedy and tragedy."

Tragically, the characters are trapped in an ontological conundrum: they wait in vain for a stranger to give them purpose, but find purpose only in the act of waiting.

But comedicly, there's a raw humor in their predicament that's expressed in dialogue and movement.

Their exchanges are full of bizarre wordplay, repetition and double meanings, antics, singing, dancing, and frantic hat swaps.

Whether the audience laughs or cries is often ambiguous, and I don't know if Beckett really distinguished between the two.

Born in Dublin, Beckett studied English, French, and Italian before moving to Paris, where he spent most of his life writing plays, poetry, and prose.

Throughout his life, Beckett was a great lover of words, but he incorporated gaps, intervals, and moments of emptiness to bring silence into his work.

This was a key feature of Beckett's work, whose erratic tempos and black humor were popularized by his absurdist theatre.

Beckett, through his mysterious authorship, neither confirmed nor denied speculation about the meaning of his work.

So the audience continues to speculate, becoming more and more drawn to Beckett's surreal world and enigmatic characters.

Because of the lack of a clear meaning, "Godot" is open to endless interpretations.

Critics have offered countless different interpretations, repeating ambiguity and speculation as if they were tracing the plot of a play.

It has been attributed to allegorical depictions of the Cold War, the French resistance movement, and the British colonization of Ireland.

The power relationship between the two characters has also been the subject of intense debate.

They were interpreted as survivors of the apocalypse, as old couples, as infertile friends, or as personifications of Freud's ego and id.

Beckett famously said the only thing certain about Vladimir and Estragon was that they wore bowler hats.

Like critics' speculations and increasingly bizarre plot lines, their interactions often go back and forth, bickering and joking, losing their train of thought, and picking up where they're going. Vladimir: Shall we start from the beginning?

Beckett teaches us that, just like everyday life, the world on stage doesn't always make sense.

It's okay to explore reality and fantasy, the familiar and the unfamiliar.

A well-written story is certainly fascinating, but a great play makes you think and wait.

Little did I know that a 19-year-old suicide bomber could teach me a valuable lesson.

But it certainly taught me

He taught me that you should never pretend to know someone you don't know very well.

It was a Thursday morning in July 2005, and the suicide bomber and I, unknowingly, boarded the same train car at the same time, standing right next to each other.

I didn't pay attention to him

no one noticed

You don't look at people when you're on the subway, but he must have seen me.

I think he looked over us all as he reached for the detonation switch.

Ever since then, I've wondered what he was thinking.

especially in the last few seconds...

I know it's not a personal grudge.

I don't think he tried to kill or hurt Jill Hicks.

because he didn't know me

no

Instead, he labeled me an unfair and unwanted label.

I was seen as an "enemy"

To him I was the 'other' to 'us' 'them'

He chose not to consider us human by the label of "enemies."

That label allowed me to press the button.

he was not picky

I was about to be among the 26 precious lives lost in the vehicle I was in alone.

Before we could catch our breath, we were thrown into a darkness so large that we thought we could touch it.

I had no way of knowing that we were the enemy.

We're just commuters, and just a few minutes ago we followed subway etiquette: no eye contact, no words, no conversation.

But as the darkness faded, we were reaching out to each other.

we were helping each other

I said my name aloud and waited for someone's response in a little bit of roll call.

"I'm Jill here.

I am alive

All right"

"Jill

here

I'm alive

are you OK"

I didn't know Alison

I listened to her confirmation that she was alive every few minutes.

I didn't know Richard

But it was important to me that he survived.

The only name I gave them was

They didn't know I was president of the Design Council.

This is my favorite briefcase that was rescued with me that morning.

They didn't know that I published an academic journal of architecture and design, that I was a Fellow of the Royal Society of Arts, that I liked wearing black -- and I still do -- that I smoked thin cigars.

I don't smoke thin cigars anymore

I was drinking gin and watching a TED talk, and of course I never expected that one day I would be standing here balancing on my prosthetic leg and giving a talk.

I'm a young Australian woman and I had a wonderful experience in London.

I couldn't let it end

I was so determined to survive that I used a scarf to tie tourniquets around the tops of my legs and cut off everything and everyone so that I could focus on myself, listen to myself and follow my instincts.

reduce the number of breaths

lift your thighs high

I fought the urge to straighten up and close my eyelids.

I think I lasted about an hour. It was an hour to reflect on everything that had happened in my life up to this point.

could have done more

I might have been able to enjoy life more and see various things

Maybe I should have started running or dancing yoga

But my priority and focus has always been work.

lived to work

The title on my business card meant a lot to me.

But inside the tunnel, that didn't matter.

When my rescuers touched me, I couldn't even say a word, not even a single word, "Jill."

I entrusted my body to them

I did everything I could and now it's in their hands

It wasn't until I saw the ID tag on my ID card at the hospital that I was admitted to that I truly understood what it was like to be human and what it meant to be human.

It read, "One person believed to be an unidentified woman."

"Unidentified" "Female" "Suspected person" "1 person"

These four words were the gift

Those words made it very clear that the only thing that saved my life was "I was human."

None of the differences affected the extraordinary efforts of the rescue workers, who risked their own lives to save my life and save as many unidentified people as possible.

It didn't matter to them whether I was rich or poor, what color my skin was, male or female, it didn't matter what my sexual orientation was, who I voted for, whether I was educated, whether I was religious or not.

Nothing mattered except that I was a precious human life.

I consider myself a living witness

I am a proof that unconditional love and respect can not only save lives, but can change lives.

Here's a picture of me from last year with one of my rescuers, Andy.

Ten years after the incident, we're here arm in arm.

The one who holds my hand tight through all that chaos

There was someone gently stroking my face

How did you feel?

i felt loved

There is something that has protected me from hatred and a desire for retaliation, and that has given me the courage to say, "I will break this chain of hatred." That is love.

i was loved

I think the potential for positive change to spread is huge, because we know what we humans are capable of.

Because I know the beauty of humanity

So I was left with a pretty big question to ponder, and a few questions for all of us to ponder. Isn't what unites us so much more than what separates us?

Can't we feel deeply connected as humans, as a species, until tragedy and disaster happen?

And when will we learn from the wisdom of our age? We embrace each other beyond mere tolerance, because until we know each other, we're just labels.

thank you

(applause)

Ichthyology is the study of fish

It sounds long and boring, but it's actually very interesting, because ichthyology is the only -ology that has "YOLO" (you only live once).

(Laughter) Now, all of you smart young people out there, you know YOLO is shorthand for "you only live once." I only live once, so I'm going to do what I've always dreamed of doing: seeing the hidden mysteries and discovering new species.

this is my mission

Recently, we've been intensively exploring caves to look for new species.

And it turned out that there are many new species of cave fish in the cave.

Just know where to look and be a little slim

(Laughter) Cave fish can teach us a lot about biology and geology.

Because the fish are trapped in tiny holes, we can see how the land masses around them have changed and moved, and their lack of sight allows us to see the evolution of vision.

Fish eyes have essentially the same structure as our eyes.

All vertebrates have eyes, and when placed in a dark, cold cave environment, some species of fish gradually adapt, over the years and generations their eyes and vision degenerate into these eyeless cave fish.

Different types of cave fish evolve slightly differently, and each has its own geological and biological background, which is what makes discovering new species so interesting.

Now, this is a new species we discovered in southern Indiana.

Ambryopsis fujurai I named it 'Indiana cave fish'

(Laughter) Kentucky Caves, Mammoth Cave System species are their closest relatives.

Millions of years ago, changes in the course of the Ohio River separated them and they began to evolve separately.

Subsequent evolution led to very subtle differences in the genetic makeup of blindness.

There's a gene called rhodopsin that's essential for vision.

We humans have it, and so do they.

It's kind of like a beautiful experiment by nature that allows us to look at the genetics of vision and the origins of vision.

At the same time, the genes of these cave fish tell us about the distant geological passage of time, and this species in particular is perhaps the best example of this.

This is a new species from Madagascar that I named Taifuriouturis mararibe.

It means "great disease" in Madagascar, and it's a reference to how we became addicted to collecting this species.

Believe it or not, swimming through pits full of corpses and caves full of bat poop isn't the best way to spend your life, but you only get one!

(Laughter) I love this fish -- well, it's been quite a hassle -- because its closest relative in Madagascar was a cave fish in Australia, 6,000 kilometers away.

There's no way an eight-centimeter-long freshwater fish can cross the Indian Ocean, so DNA comparisons show that species diverged more than 100 million years ago, when the southern hemisphere's continents were last joined together.

In fact, these races don't move at all, so

the continent must have carried them

DNA information can tell us in great detail how and when ancient crustal movements occurred.

This species was only recently discovered, so I can't even tell you its name yet, but we know it's a new species from Mexico, but it's probably already extinct.

It's thought that this fish may have gone extinct because the only known cavern habitat for this fish was destroyed by the construction of a nearby dam.

Unfortunately for the cave fish that live in groundwater, it is also a major source of drinking water for humans.

We don't yet know the closest relatives of these fish.

Not Mexico, maybe Cuba or Florida or India.

Either way, we can expect new discoveries in the geology of the Caribbean Sea and better biological analysis of certain types of blindness.

I hope we find them before they go extinct.

As an ichthyologist, I will continue to dedicate my life to discovering and preserving the humble little cave fish that provide us with so much biological insight into the geology and vision of our planet.

Thank you very much

(applause)

Hello my name is Aparna

I'm a shopaholic -- (Laughter) addicted to returning online purchases.

(Laughter) It used to be

At one point, two or three boxes of clothes would arrive every other day.

I used to buy the same thing on purpose in different sizes and colors because I didn't know what I really wanted.

I would order extra, try them on, and return anything I didn't like.

One time, my daughter saw me returning a few packages and said, "Mommy, you seem to have a problem."

(Laughter) I didn't think so.

Free shipping Free return shipping right?

(Laughter) I never really thought about it until I heard some shocking data at work.

I'm an international solutions director for a top retailer, and one day I was in a meeting with one of our biggest customers, discussing how to cut costs.

Their biggest concern was dealing with returns.

Between the last Thanksgiving and the end of the year alone, 7.5 million clothes were returned.

I couldn't get it out of my head

What happens to the clothes that are returned?

I went home and tried

We found that 1.8 million tons of clothing returned each year ends up in landfills.

It's as if everyone in the United States did one load of laundry last night and today throws it in the trash.

I was appalled

I felt, "I am the only one in all of humanity who can help prevent this from happening."

(Laughter) My job is to solve these logistics problems, not to create them.

So this problem became my own problem.

I said, "OK, we're going to solve the problem."

We can solve this with existing systems that we have already built.

And then I started to wonder, how did this happen?

Just six years ago, a study found that customers would buy more if they could return their purchases online for free.

More and more companies are starting to offer free returns to boost sales and provide better customer service.

What we didn't realize was that the service caused more returns.

In 2017 alone, companies lost $351 billion in sales in the United States.

Retailers are scrambling to make up for their losses.

We will resell the returned products online or sell them to our affiliated bargainers and liquidators.

Essentially, if companies can't quickly and economically find a place where their returned goods aren't wasted, they end up in the landfill.

I suddenly felt guilty that I was the shopper who was causing this.

I had no idea that my ignorant buying behavior would hurt not only me, but the planet as well!

And as I was thinking about what to do, I couldn't get it out of my head -- why should the returned merchandise be returned to the retailer in the first place?

What if there was another way that works for everyone?

What if when someone wanted to return something, they could pass it on to the next buyer who wanted it instead of the retailer?

What if, instead of returns, we could implement what I call the "green turn"?

Consumers use the app to take a photo of the item and prove its condition while returning the item.

An artificial intelligence system sorts items into unused and slightly used items according to their condition, and delivers them to the appropriate buyers.

Unused clothes automatically go to the next buyer, and clothes that have been worn a few times are discounted and resold online.

Retailers can decide how many times to resell a particular product

Consumers just take a code sent to their mobile device, take it to the nearest carrier, have it packed and shipped, and the item goes from the first buyer to the next, without going to the landfill.

You're probably wondering, "Do people really do all this trouble?"

If there is motivation, I think I will do it. Point service, cashback, etc.

Let's call it "Green Cash"

This mechanism will open up new business opportunities for new customers who want to buy returned goods.

This system will transform a fun experience like shopping into a sublime experience that saves the planet.

(Applause) This is doable, but it will probably take half a year to retool the existing system and try it out.

Even before that logistics system is in place, there is something we, as consumers, can do right now, if every adult in the United States shop a little differently.

Take some time to do some research and think about, do we really need this product?

No Do you really want this product? think before you buy

If every adult in the United States returned five fewer items this year, 110,000 tons of clothes would be spared the landfill.

An easy 6 percent reduction

This environmental problem we've created is not thousands of years away, it's happening now, and it must stop now to stop the spread of landfills around the planet.

I want to leave my daughter and granddaughter a better and cleaner planet, so not only will I stop ordering more, but I will recycle more.

you can do it it's not difficult

Before we flood our shopping carts and landfills with excess products we don't want, the next time we shop online, take a deep breath and think about what we want most: a beautiful planet to call home.

thank you

(applause)

Imagine yourself as a soldier in the middle of a fierce battle.

It could be a Roman infantryman, a medieval archer, or a Zulu warrior.

Even if times and places change, there are things that remain the same.

Adrenaline builds up and you act according to your deeply ingrained reflexes based on your need to protect yourself, your allies, and defeat your enemies.

Now imagine being a scout in a much different role.

A scout's job is not to attack or defend.

A scout's job is to understand

The scouts go out and map the terrain and identify potential obstacles.

And they have a purpose, like finding a bridge that's conveniently located to cross a river.

Scouts want, more than anything else, to know as accurately as possible what's out there.

Soldiers and scouts are essential to an army.

We can also think of these two as mindset types, as metaphors for how we process information and ideas in our everyday lives.

What I want to argue today is that making good judgments, making accurate predictions, and making good decisions depends a lot on which mindset you're on.

To see the difference between these two mindsets, let's take an event in 19th-century France, where this seemingly innocuous piece of paper set off one of the greatest scandals in history.

It was discovered in 1894 by an officer of the French General Staff.

It had been torn up and thrown in a trash can, but when I put it back together, I discovered that one of my comrades was leaking military secrets to the Germans.

An extensive investigation ensued, and suspicion was quickly directed to this person, Alfredo Dreyfus.

He had a respectable background, no previous criminal record, and I didn't see any motivation to spy on him.

But Dreyfus was the only Jewish officer in the army's general staff, and unfortunately there were strong anti-Semitic tendencies in the French army at the time.

Dreyfus's handwriting was checked against the note in question and determined to be a match.According to an outside handwriting expert, the match was uncertain, but that's not the point.

I've searched Dreyfus' room and combed through the papers for evidence of espionage.

nothing came out

So not only did they become more suspicious, but they also took the view that he was a sly fellow, after all, he was able to cover up all the evidence before he was found.

Then they also examined his background for evidence of his guilt.

I learned from an old teacher that he was learning a foreign language, which clearly shows that he was later trying to conspire with a foreign government.

The teacher also mentioned that Dreyfus was known to have an excellent memory.

As a spy, you have to memorize a lot of things.

The case was brought to trial, and Dreyfus was found guilty.

As they dragged Dreyfus into the square, they ceremoniously ripped his insignia from his uniform and snapped his sword in two.

It's called "Dreyfus's stripping of rank."

And he was sentenced to life imprisonment on a barren island aptly named "Devil's Island" off the coast of South America.

Sent to the island, Dreyfus spent his days in solitude, writing numerous letters to the French government petitioning for a retrial so he could prove his innocence.

But the government thought the matter was closed.

What's interesting about the Dreyfus case to me is why they were so sure of Dreyfus's guilt.

You might think that Dreyfus was put there on purpose.

according to historians it's not

As far as we know, officials at the time genuinely believed that Dreyfus was guilty.

It makes you wonder, what is the human psychology that makes you feel guilty with such little evidence?

This is an example of what scientists call "motivated reasoning."

It's a phenomenon where unconscious motives, desires and fears influence how we interpret information.

To some information or idea we feel like allies

I want it to win I want to protect it

I feel like I'm an enemy to other information and ideas, and I want to crush them.

That's why I call this motivated reasoning the "soldier's mindset."

I don't think many of you have ever accused a French-Jewish officer of high treason, but if you look closely at sports or politics, you might think of it.

On the other hand, when taking fouls from the opposing team,

I think, "Good! Good verdict, I don't need to check any more."

Or when you read about research on controversial policies like the death penalty.

If I'm in favor of the death penalty, and the research shows that the death penalty is ineffective, I feel a desire to find some fault.

But if the conclusion is that the death penalty works, then I'm quickly convinced that it's a good study.

And vice versa, people who oppose the death penalty react similarly.

Our decisions are subconsciously strongly influenced by who we want to win.

this is seen everywhere

Our thoughts are shaped that way, our health, our relationships, who we vote for, what is fair and what is ethical.

What's scary about this "motivated reasoning" or "soldier mindset" is that it's unconscious.

You think you're objective and fair, but you can ruin the lives of innocent people.

Fortunately for Dreyfus, history doesn't end here.

This is Colonel Piccard

A high-ranking officer in the French army, he thought, like everyone else, that Dreyfus was guilty.

Also, like many other military personnel, he was anti-Semitic.

Still, Piccard begins to doubt, "Could it be that Dreyfus is falsely accused?"

We found evidence that information leaked to Germany even after Dreyfus was imprisoned.

We also found that the handwriting of another officer in the army matched the note perfectly and was much more similar to Dreyfus's.

He reported this discovery to his superiors, but to his dismay, they were either indifferent or offered elaborate explanations, "It was just that another spy who imitated Dreyfus's handwriting appeared and took over the espionage.

Dreyfus is still guilty."

In the end, Piccard was able to prove Dreyfus's innocence.

It took ten years, during which Piccard himself was imprisoned for disloyalty to the military.

A lot of people feel that Piccard can't be heroized in this matter.

But personally, I feel that his anti-Semitism made his actions all the more admirable. Like other officers, he was prejudiced and prejudiced, but his drive to find and stick to the truth triumphed over it all.

Piccard really embodies what I call the "scout mindset."

Rather than let either idea win, I try to see what it really is as accurately and honestly as possible — even if it's not convenient, comfortable, or pretty.

This is a mindset that I am strongly interested in.

I've spent the last few years trying to figure out what exactly drives the scout mindset.

How can some people, if not always, overcome their own prejudices and biases and motives and look at facts and evidence as objectively as they can?

the answer lies in emotion

Just as the soldier's mindset has its roots in feelings like defensive instincts and tribalism, so does the scout's mindset.

rooted in some other emotion

Scouts are curious

The joy of learning new things and the desire to solve puzzles tend to prevail.

When you're faced with something unexpected, you're intrigued.

Scouts have another set of values.

It's good to test your assumptions, and it's not a weakness to change your mind.

And most of all, scouts are self-reliant. They don't associate their human worth with being right or wrong about something in particular.

That's why I thought the death penalty was effective.

And if the research shows otherwise, I think, "Well, I guess I was wrong, but that doesn't mean I'm stupid."

Researchers have found that this set of properties leads to better decisions, and I've found this empirically myself.

I want you all to remember that this trait is basically not related to being smart or knowledgeable.

In fact, it doesn't correlate very well with IQ.

it's a matter of how you feel

There is a quote by Saint-Exupéry that keeps coming back to me

The person who wrote "The Little Prince"

"If you want to build a ship, don't tell your men to gather wood and divide the work.

It is to bring out the feeling of admiration for the vast and endless sea.”

In other words, if we, as individuals and as a society, really want to improve our judgment, what we need most is not knowledge of logic, rhetoric, probability, economics, whatever, even though it's valuable in its own right.

The most important thing to master these principles is the scout mindset.

I need to change the way I feel

We need to learn how to be proud instead of ashamed when we realize our mistakes.

When you encounter information that conflicts with your own, you need to learn how to find it interesting rather than defensive.

I want you to ask yourself, "What do you admire most about yourself?"

Is it to defend your beliefs?

Or is it about seeing the world as clearly as possible?

thank you

(applause)

I conducted a fact-finding survey at "Free America," which I sponsor.

Not only did I meet with prosecutors, but I also met with members of the legislature and inmates serving time in state and local prisons.

Go to the immigration detention center

I heard a lot of people's opinions

What we've learned is that atonement in prisons, detention centers, and immigration detention centers is possible, and provides hope for a new life after serving time.

Rethink the flow of the detention system from the beginning.

What would happen if, from the very beginning, we took measures that made rehabilitation the primary goal, and made love and care -- our core values?

I believe that then we will have a safer, healthier society, and then a safer, healthier, safer society to raise our children.

Let me introduce you to James Cavitt.

James served 12 years in San Quentin State Penitentiary and was released after 18 months.

James is just like us, he's made the worst mistakes, but he's better than the sin itself.

He's a father, husband, son, and a poet.

He's committed a crime and is making amends for it, and he's eager to learn his skills so that when he returns to society, he'll be able to contribute to society.

James -- and there are many prisoners like him -- is an example of how we can heal together when we believe that mistakes don't define who we are, and that everyone deserves atonement for our sins, and when we reach out to those who collectively serve their prison sentences.

Now I'll take James' place and listen to his spoken word poem about his journey of redemption.

James Cavitt: Thank you John

Welcome to San Quentin State Prison

Inside the walls of this prison is a treasure trove of talent.

Future Software Engineers Entrepreneurs Artisans Musicians and Artists

The source of inspiration for this work is the image of the men and women who live in it, trying hard to make a fresh start after serving time in prison and for their own futures.

The title of the work is "Where I Live Now"

No one is afraid to come near where I live

Surrounded by high concrete walls and iron bars, where razor-like barbed wire cuts through hopes for tomorrow

Where I live, killing the soul of a murderer is trying to teach them that murder is wrong.

think about it

Rather than that, imagine a world where people whose wounds are healed heal others who are hurt and become stronger.

Then we can all sing "Redemption Song"

I live in what the incarcerated call "hell on earth"

But what I learned from there is that prison can change depending on how you feel.

Even in the harsh reality, there is actually a light of hope

Freedom will come someday, it's just a matter of time

So from the first step I took it like the last mile I took care of it I also learned that you don't have to be free to experience freedom

Even if you're not imprisoned, it doesn't mean you're free.

Everyone is fighting the devil that lurks within them

Behind that smile hides an unbearable pain Screaming out, set me free!

don't you understand?

All humans are in prison.The only difference is where they pay their bills.

I escaped from a prison of my own making

The key to escape is forgiveness Action is my witness

action is my witness

If you want freedom, change your mindset

because what is freedom

not where you are

because it's a way of thinking

thank you

(Applause) (Piano) John Legend: Pirates took me by force

Sold to a slaver's ship

I was just bought out of the depths of despair

But my hands are strong

With great pride, we move forward in this era

Won't you sing with me songs of freedom

All I've ever sung— a song of redemption

redemption song

out of mental slavery

free yourself

Don't be afraid of nuclear power, because nothing can stop time

How long are you going to stand by while our prophet is killed?

It's part of the book of prophecy, so I must complete the book.

Won't you sing with me songs of freedom

All I've ever sung— a song of redemption

redemption song

(Piano) From Mental Slavery

free yourself

Don't be afraid of nuclear power, because nothing can stop time

How long are you going to stand by while our prophet is killed?

It's part of the book of prophecy, so I must complete the book.

Won't you sing with me songs of freedom

All I've ever sung— a song of redemption

redemption song

a song of freedom

All I've ever sung— a song of redemption

redemption song

redemption song

(Piano) (Applause) Thank you.

thank you

(applause)

I once had a recurring dream, when I walk into a room full of people, I try not to make eye contact with anyone.

If someone notices me in time, I panic.

The person comes up to me and says, "Hi, what am I?

What's your name? ”

I remain silent and cannot answer

After an awkward silence, the other person continues, "Have you forgotten your name?"

i am still silent

Then everyone else in the room slowly turns to me and asks in unison, "Did you forget your name?"

Even if the voices that speak to each other grow louder, I still can't answer

I'm a visual arts artist

Some of my works are humorous, some are a little funny, but some are sad.

One of the things that I really enjoy doing is making short animations because I get to voice different characters.

I used to be a bear

(Video) Bear (in the voice of Saleem): Hi

(Laughter) (Salim) It was once a whale.

(Video) Whale (in the voice of Saleem): Hi

(Laughter) (Salim) It was also a card.

(Video) Card (in the voice of Saleem): Hi

(Laughter) (Salim) My favorite is Frankenstein's monster.

(Video) Frankenstein's Monster (in Saleem's voice): (Growls) (Laughter) (Saleem) I groaned a lot this time.

A few years ago, I made an educational video about the history of video games.

At that time, I was able to voice Space Invaders.

(Video) Space Invaders (voiced by Saleem): Hi

(Saleem) It's a dream come true. (Laughter) When this video was posted online, I sat down at my computer and kept hitting the refresh button to see how the audience reacted.

I got the first comment

(Video) Comments: Very nice

(Salim) I did it!

Press the "Update" button

(Video) Comments: Great looking forward to the next one

(Salim) This was the first of a two-part series.

I was planning on making a second one.

Press the "Update" button

(Video) Comments: Where's part 2? where? I want to see it now! (laughter) (Salim) Someone other than my mother is complimenting me on the internet!

I thought I was finally accepted

Press the "Update" button

(Video) Comment: It's an irritating voice, no offense

(Salim) If you don't mind, I'll update again.

(Video) Comments: Remake without putting peanut butter in your mouth

(Salim) At least a constructive opinion, press 'update'

(Video) Comments: Don't use this narrator anymore I don't understand what you're saying

Press "Update"

(Video) Comment: I didn't understand the content because of my Indian accent

(Salim) Hold on, let me say two things.

First of all I don't have an Indian accent I have a Pakistani accent OK?

Second, I definitely have a Pakistani accent.

(Laughter) I kept getting comments like this one after another, so I decided to ignore them and start working on part two.

I recorded the audio, but every time I tried to edit it, it didn't work.

Every time I tried, it brought back memories of my childhood, when I had a harder time speaking.

I struggled with stuttering for a long time.

I was the kid in class who didn't raise his hand even though he had a question and knew the answer.

I ran to the bathroom so I wouldn't have to pick up the phone every time my house phone rang.

If the call came to me, it said my parents were out of the house.

I often stuck in the toilet

And I hated introducing myself, especially in front of multiple people.

I stutter my name all the time, and usually someone says, "Did you forget your name?"

everyone there laughs

It's a routine joke that never gets old

[Worst guys] (Laughter) I spent my childhood feeling that if I said anything out loud, they would immediately think I was something wrong, that I wasn't normal.

so i was mostly silent

So finally being able to use my voice in my work was a big step for me.

Whenever I recorded audio, I would repeat every sentence over and over again, trying to get it right, and picking the best of the recordings.

(narrated by Saleem) Audio Editing is Voice Photoshop

You can slow it down, speed it up, slow it down, echo it.

If you stutter somewhere If you stutter somewhere, rewind and fix it

it's like magic

(Salim) So using my edited voice in the work was a way to finally make it sound normal to me.

But when I saw the comments on the video, it didn't feel normal anymore.

So I stopped using my voice in my work.

Since then, I've spent a lot of time thinking about what it means to be normal.

And what I've learned is that "normal" has a lot of expectations attached to it.

Let's take an example

I learned a story written by the ancient Greek writer Homer.

Homer only mentions a few colors in his work.

Even though I mentioned it, it seems that you somehow took a slightly different view.

For example, the ocean is described as wine red, people's faces are green, and sheep are purple.

But it's not just Homer

If you look around all the ancient literature -- ancient China, ancient Iceland, ancient Greece, ancient India, and even the original Hebrew Bible -- the number of colors mentioned is very small.

The most accepted theory as to why is that cultures begin to perceive colors only when they can create them.

So you can make a certain color, and then you can finally see it.

Colors that were relatively easy to create in many cultures, such as red, began to appear relatively early on.

But colors like blue, which are much more difficult to make, were not learned much later in many cultures.

So it wasn't until much later that I started seeing it.

Until then, even if a certain color is everywhere, you won't be able to see it.

I can't see it

It doesn't fit into people's "normal" category.

This story helped me put my experience in context.

When I first read the comments on the video, I thought they were all directed at me.

But the people who made the comments didn't know how much I cared about my voice.

Most of what they were reacting to was my accent, and it's not normal for the narrator to have an accent.

But what is "normal"?

Proofreaders find more errors in texts when they know they're black.

College professors tend not to support women and minority students

A resume with a white-sounding name is more likely to lead to an interview than a resume with a black-sounding name.

Why?

because there are expectations about what is "normal"

Black students tend to think it's "normal" to make spelling mistakes.

Women and minority students are often thought to be "normal" not to succeed.

And we think it's "normal" to hire white employees over black employees.

Research suggests that most of this discrimination is just favouritism, not so much because you want to hurt people you don't know, but because you want to help people you know.

Feelings of unfamiliarity start at a very early age

Let's take an example

When a library surveyed the characters in its children's book collection every year, it found that in 2014, only 11 percent of the characters in its collection were people of color.

The year before, it was only 8 percent, while today half of all children in America are born to minority families.

it's half

There are two big problems here

First, children are taught that they can be anything and they can do anything, but most of the stories that children of color read are about people who are different from them.

Second, people in the majority don't realize how similar they are to people in the minority: in their everyday experiences, in their hopes, in their dreams, in their fears, in their love of hummus.

Delicious, isn't it!

(Laughter) Like blue for the ancient Greeks, minorities are not included in "normal," because "normal" is simply the structure we've been exposed to, the things we see around us.

I have a little difficulty here

We can also accept the existing notion of "normal," that "normal" is good and anything that doesn't fit this very narrow definition is bad.

Or you can question the notion of "normal" by your work, your voice, your accent, by being on this stage, even if you're really scared and want to run to the bathroom.

(Laughter) (Applause) (Video) Sheep (in Salim's voice): Gradually, I started using voices in my work.

i feel good

Also, if a lot of people say that the way I talk is like this, I get nervous.

(Laughter) (Salim) But now I have a better understanding of what's at stake, and I can't just give up.

The ancient Greeks didn't wake up one morning and suddenly find the sky blue.

It took centuries for humans to realize what they had been ignoring for so long.

So we have to constantly challenge the notion of "normal," because only then, as a society, can we understand what emptiness is.

(Video) Character: Thank you Thank you Thank you Thank you

Frankenstein's Monster: (grunts) (laughter) Thank you.

(applause)

(Bass guitar) (Bass guitar and accordion) ♪You're the oldest you've ever been♪ ♪And you're getting older and older♪ And you're getting older and older♪ ♪ And even faster ♪ ♪ And even faster ♪ ♪ And even faster ♪ ♪ Today ♪ ♪ And even faster ♪ ♪ And even faster ♪ ♪ You're the oldest you've ever been ♪ ♪ And you're getting older and older ♪ And you're getting older and older I'm getting older ♪ Thank you very much

good morning

They Might Be Giants

(Applause) I'm using ear monitors that Al Gore used in a TV interview, so what I'm hearing now is not the transmission on this stage, but the transmission at that time.

Well, with that said, let's start the presentation using PowerPoint, everyone.

I will play a new song from now on

In the spirit of TED, we've got a brand new song that hasn't been released yet.

John, can you introduce the song?

This is the song of a creature called a hawk moth, and this is a creature that mimics another creature that mimics another creature.

It's really nonsense, so I can't explain it unless I make it into a song

♪Everyone screams and flies like a bizarre nightmare♪ ♪Moth-bird bees♪ ♪I can't even take a walk♪ ♪Because I'll be attacked♪ ♪By the moth-bird bees♪ ♪Cat-birds are cats♪ ♪But there's something insect-like♪ ♪Manhouse lives inside me♪ ♪ ♪ ♪ ♪ I overthrew mice and humans on the 20th ♪ ♪ Twisted plans ♪ ♪ Impossible ♪ ♪ Because he's just a hummingbird moth ♪ ♪ Even though he's pretending to be a bird ♪ ♪ He thinks he's a bee ♪ ♪ New orders ♪ ♪ Electronics ♪ ♪ Delivered to the bottom of the sea ♪ STP sticker on it ♪ Orange nuclear submarine ♪ ♪ I'll ship it ♪ ♪ Washer fluid in the air It's flying all over the place Under the hat ♪ Headlights under head lice ♪ ♪ Subatomic waves ♪ ♪ In underwater caves ♪ ♪ Moth bird bees ♪ ♪ Finally the moth overthrew the mice and humans on the 20th ♪ ♪ Twisted plans ♪ ♪ Impossible ♪ Because he's just a hummingbird moth ♪ ♪ Even though he's pretending to be a bird ♪ ♪ He's mistakenly thinking he's a bee ♪ ♪ Are we the funny ones? Or the world? ♪ ♪ Everyone's transformed ♪ ♪ Seeing that swarm ♪ ♪ Moth-bird bees ♪ ♪ Moth-bird bees ♪ ♪ Protozoa, snakes and horses ♪ ♪ Volunteers for the army ♪ ♪ Moth-bird bees ♪ ♪ Cat-birds are cats ♪ ♪ But there's insectism ♪ ♪ Manhouse lives inside of himself ♪ ♪ With a thoughtful human brain ♪ ♪ Both ♪ ♪ Can't match his weirdness ♪ ♪ Moth-bird bees ♪ (Applause) Thank you.

Thank you very much

We've given over 1,000 concerts

maybe 1,500 times

I'm not exactly sure

We've only had two concerts in 2007 so far, but the first was the coldest we've ever played.

It was -5 degrees in St. Louis about a month ago, and I'm happy to report that today's performance is the fastest we've ever played.

thank you very much

Ladies and gentlemen, we are culture test pilots.

How early in the morning can a rock performance start?

There's not much information about the 8:30 in the morning gig.

-I can tell you about playing the 5th It was fantastic

By the way

We don't know much about the history of violinists, but when we went to New Jersey, we learned that violence was on the rise.

The song "Asbury Park"

Based on real experience

♪ Me ♪ ♪ I ♪ ♪ I got kicked ♪ ♪ I got kicked in the head ♪ ♪ In Stone's dressing room ♪ Stone Pawn ♪ ♪ Stone Pawnee ♪ ♪ I got kicked in the head ♪ ♪ In Stone Pawnee's dressing room ♪ ♪ I told him it wasn't me who stole his beer ♪ ♪ I ♪ ♪ I got kicked ♪ ♪ I got kicked in the head ♪ ♪ In Stone's dressing room ♪ ♪ Stone Pawn ♪ ♪ Stone Pawnee ♪ ♪ I got kicked in the head ♪ ♪ In Stone Pawnee's dressing room ♪ ♪ I stole his beer ♪ ♪ I told him it wasn't me ♪ ♪ Another guy who looked like me ♪ ♪ It wasn't me! ♪ ♪ Not me! ♪ ♪ Not me! ♪ thank you

Marty Beller on drums

(Applause) I wanted to play as many songs as possible in this short amount of time, so I thought, well, this song.

"Fingertips"

♪ Everything's on fire ♪ ♪ Oh, everything's on fire ♪ ♪ Oh, everything's on fire ♪ ♪ ♪ Finger tips ♪ ♪ Finger tips ♪ ♪ Finger tips ♪ ♪ I hear the wind ♪ ♪ I hear the wind ♪ ♪ It's like I'm talking to you ♪ ♪ Hello ♪ ♪ Hello ♪ ♪ I love you ♪ ♪ Who is standing? ♪ ♪ I got a new friend ♪ ♪ You're under my pillow ♪ ♪ Now break my car ♪ ♪ Now break my car ♪ ♪ Now break my car ♪ ♪ Now break my car ♪ ♪ Isn't it you who hit me? ♪ ♪ Wasn't it you who hit me? ♪ ♪ Get me some milk ♪ ♪ Get me some milk ♪ ♪ Get me some milk ♪ ♪ Leave me alone ♪ ♪ Who's knocking on the wall? ♪ ♪ All alone, all alone ♪ ♪ No one ♪ ♪ What is that blue thing doing here? ♪ I don't understand you ♪ I don't understand you ♪ ♪ I don't understand you ♪ ♪ I don't understand you ♪ ♪ I don't understand what you say ♪ ♪ I can't understand a single word you say ♪ ♪ you don't understand ♪ ♪ you don't understand ♪ ♪ you don't understand ♪ ♪ you turned around ♪ ♪ to see the sound ♪ ♪ to see the thing that made the noise ♪ I'm having a seizure ♪ ♪ Fingertips ♪ ♪ Fingertips ♪ ♪ I'm walking down a darkened hallway ♪ ♪ And I'm walking down a darkened hallway ♪ Thank you very much It was "Fingertips"

(Applause) ♪I'm getting calls from the dead ♪ ♪I'm getting calls from the deceased ♪ ♪I'm taking calls from the deceased ♪They're calling from beyond the grave♪ ♪From beyond the grave♪ ♪They have something to ask♪

We're taking calls live here on the TED stage in Monterey.

I think I just got a call

hello

It's live

Who are you?

is it being broadcast?

Hello

Live on air with They Might Be Giants

I'm Eleanor Roosevelt

Hello Eleanor Um...

let me talk

Eleanor, the radio is loud.

let me talk to randy

Do you have a question for Randy?

Can you tell me what you want to hear?

I want to talk to that famous Randy.

Eleanor, do you have a membership card?

I want a million dollars

Eleanor, I'm sorry, do you have a membership card?

no i don't have

Well, I think I'll end this around here.

I highly recommend the song I'm going to play from now on as the theme song for TED.

At first glance, it's a song for children, but in fact it's a common song for adults pretending to be for children.

The song title is "Kuni no

alphabet! ”

♪ Algeria, Bulgaria, Cambodia, Dominica ♪ ♪ Egypt, France, Gambia ♪ ♪ Hungary, Iran, Japan, Kazakhstan ♪ ♪ Libya, Mongolia ♪ ♪ Norway, Oman, Pakistan ♪ ♪ Qatar, Russia, Suriname ♪ ♪ Turkey, Uruguay, Vietnam ♪ ♪ West Zyrophon, Yemen, Zimbabwe ♪ ♪ Algeria, Bulgaria, Cambodia, Dominica ♪ ♪ Egypt, France, Gambia ♪ ♪ Hungary, Iran, Japan, Kazakhstan ♪ ♪ Libya, Mongolia ♪ ♪ Norway, Oman, Pakistan ♪ ♪ Qatar, Russia, Suriname ♪ ♪ Turkey, Uruguay, Vietnam ♪ ♪ West Xylophone, Yemen, Zimbabwe ♪ ♪ Azerbaijan, Bolivia, Canada ♪ ♪ Australia, Belgium, Chad ♪ ♪ Afghanistan, Brunei, China, Denmark ♪ ♪ Ecuador, Fiji, Guatemala ♪ ♪ Al Geria, Bulgaria, Cambodia, Dominica♪ ♪Egypt, France, Gambia♪ ♪Hungary, Iran, Japan, Kazakhstan♪ ♪Libya, Mongolia♪ ♪Norway, Oman, Pakistan♪ ♪Qatar, Russia, Suriname♪ ♪Turkey, Uruguay, Vietnam♪ ♪West Xylophone, Yemen, Zimbabwe♪ Thank you very much

It was a great 8:30 crowd

have a nice session

Thank you very much

Imagine being part of a crew of astronauts traveling to Mars or some other distant planet.

The move is likely to take a year or longer.

[Reusing carbon in space] Space and resources inside a spacecraft will be limited.

You and your crew must find a way to produce food with minimal resources.

What if you could take a few bags of seeds and grow them in just a few hours?

What if that crop yielded so many more seeds that the entire crew could feed on just a few sacks of seeds for the duration of the voyage?

Actually, scientists at NASA have figured out how to do it.

their ideas are really interesting

This involves microbes, which are single-celled organisms.

Also uses hydrogen derived from water

It uses microbes called hydrogen-oxidizing bacteria to create a good carbon cycle to sustain life onboard a spacecraft.

When astronauts breathe, they exhale carbon dioxide, and this carbon dioxide is absorbed by microbes into nutritious, carbon-rich crops.

Astronauts eat this carbon-rich crop and exhale the ingested carbon in the form of carbon dioxide, which is absorbed by microbes into a nutritious crop, and that carbon becomes carbon dioxide, which the astronaut exhales.

This creates a closed loop in the carbon cycle.

So why is this important?

We humans need carbon to survive, and carbon is ingested in the form of food.

For long-term space travel, we can't just find and consume carbon along the way, so we have to figure out a way to recycle it on board.

Sounds clever, doesn't it?

But in practice, this research never came to fruition.

We haven't reached Mars or any other planet.

This research was done in the '60s and '70s.

So my research colleague, Dr. John Reed, and I are interested in recycling carbon on this planet.

I wanted to find technical solutions to tackle climate change.

And as we were reading papers on this study from the '60s, from 1967 onwards, we found papers on this study.

i thought this was a great idea

So I tried to think of the Earth as being like a spaceship.

In a limited space, with limited resources, even on Earth, we need to think about how to recycle carbon.

So the idea was born: Could we take some of the ideas that NASA had, and apply them to the problem of carbon on Earth?

Could it be possible to grow microbes like NASA thought and create products that would be useful on Earth?

we started a company for that

In our research at this company, we found that hydrogen-oxidizing bacteria -- what I call nature's "enhanced carbon recyclers" -- are powerful microbes that are largely overlooked and understudied, and that they can produce very useful products.

So we started growing this microbe in the lab.

We found that we could use this microbe to make essential amino acids from carbon dioxide.

We can also make high-protein flours that contain amino acids similar to animal proteins.

[Oils and fats for nutrition and industry] Through further cultivation, we found that we can also produce oils and fats.

Fats and oils are used in the production of various products

We've been able to create an oil that's similar to citrus oil, and it can be used as a flavoring agent, a fragrance, but also a biodegradable detergent and even an airplane fuel.

We were able to make an oil similar to palm oil.

Palm oil is used to produce a wide variety of consumer and industrial products.

We've started working with manufacturers to scale this technology, and we're doing research together to bring these products to market.

We believe that these technologies can help us recycle carbon dioxide and turn it into valuable products, which is not only good for the planet, but good for industry.

this is the current effort

But in the future, if we can take these technologies and these microbial applications to the next level, they will help us achieve even greater things.

[A new kind of crop cultivation] We believe that this technology will help us to address the problems of agriculture, and that we will be able to create sustainable agriculture to meet the food needs of the future.

Why do we need sustainable agriculture?

In fact, it's estimated that by 2050, the world's population will grow to 10 billion people, and that will require a 70 percent increase in food production, according to estimates.

And we need more resources and raw materials to make consumer goods and industrial products.

So how do we meet that demand?

Modern agriculture cannot meet that demand sustainably.

there are many reasons for that

One is that modern agriculture is one of the biggest contributors to greenhouse gas emissions.

[Agriculture produces more greenhouse gases] In fact, agriculture produces more greenhouse gases than cars, trucks, planes, and trains combined.

Another reason is that modern agriculture requires a lot of land.

We've cut down 50 million square kilometers of forest for crops and livestock.

how much is that?

Roughly the size of South America and Africa combined.

Let's talk about an example of

In Indonesia, a pristine rainforest the size of Ireland was cleared between 2000 and 2012.

Think about the loss of species and biodiversity: plants, insects, animals.

We lost our natural carbon sink.

Let's make this more realistic

The main reason this felling was done was to make room for palm trees.

As I said earlier, palm oil is used to create many different products.

In fact, more than half of all consumer products are estimated to contain palm oil.

The products include ice cream and cookies

Includes cooking oil

So are detergents, lotions and soaps.

You and I probably have a ton of palm oil products in our kitchens and bathrooms.

You and I are direct beneficiaries of deforestation.

Modern agriculture has a problem, and if we want it to be sustainable, we need a solution.

I think microbes may provide part of the answer, especially enhanced carbon recyclers.

Enhanced carbon recyclers, like plants, act as natural recyclers in ecosystems.

It thrives in rare places on Earth - hydrothermal vents and hot springs.

In these ecosystems, they take up carbon and recycle it as nutrients needed by the ecosystem.

It's very nutritious and can be turned into oils, proteins, minerals and carbohydrates.

In fact, microbes have become an integral part of our daily lives.

If you want a glass of red Pinot Noir on a Friday night to end a busy week, you're drinking a microbial product.

If you're drinking beer from a local microbrewery, it's also a product of microbes.

[Eating microbial products] Same goes for bread, cheese and yogurt.

These are all products of microorganisms

The beauty and power of enhanced carbon recyclers is that they can be produced in hours, not months.

So this would allow us to grow crops much faster than we can now.

Because it grows in the dark, it can be grown in any season, in any terrain or location.

can be grown in containers that take up minimal space

So we can shift to what we call vertical farming.

Instead of our traditional horizontal farming, which requires a lot of land, we can plan vertically, so we can produce much more per acre.

By implementing this approach and using enhanced carbon recyclers, we no longer need to cut down rainforests to produce the food and goods we consume.

Because on a larger scale, you can get 10,000 times more production per plot of land, so if you're using soybeans, let's say you plant the same amount of land with soybeans for a year.

10,000 times in one year

The new kind of farming looks like this

In this way, we can create a system that can sustainably meet the needs of 10 billion people.

What are the products of this new agriculture?

Flours containing protein are already made, and you can think of flours made from soybeans, cornmeal, wheat flour, and so on.

Oils and fats are also produced, which could be similar to coconut oil, or olive oil, or soybean oil.

These crops can actually produce nutrients that can be used to make a variety of nutritious foods such as pasta, bread and cakes.

In addition, oils and fats are used to make a wide variety of products, both industrial and consumer, so detergents, soaps and lotions could be made from these crops.

Not only are we running out of land, but if we continue with modern farming as it is, we could be depriving our descendants of a beautiful planet.

But you don't have to

we can envision a prosperous future

Let's create a system that protects this planet, our spaceship, not just from collisions, but a system that allows us to develop systems and ways of life that will benefit our lives and the lives of the 10 billion people on this planet by 2050.

thank you

(applause)

[Recorded internet communications from Homs, destroyed in the Six Years War in Syria, May 2016] My name is Marwa and I'm an architect.

I was born and raised in Homs.

After six years of war, Homs is now half-destroyed.

Luckily, our family still has a place to live.

For two years we were under house arrest.

Because outside there were constant demonstrations and fights, explosions and shootings.

My husband and I used to run an architectural office in the main square of the Old Town.

That's no more. The old town is almost gone.

Half of the city is reduced to rubble

After the ceasefire at the end of 2015, much of Homs began to calm down somewhat.

People continue to struggle in a completely collapsed economy.

The people who used to set up shop in the old town market now do business in shanties on the street.

Underneath our apartments are carpenters, confectioners, butchers, printers and workshops.

I started teaching part-time and opened a small bookstore with my husband who worked several jobs.

Everyone is doing different jobs and making ends meet.

When I look at this destroyed city, I ask myself, Why was there such a senseless war?

Syria is a generally tolerant place, historically taking diversity for granted and embracing a wide range of different beliefs, origins, customs and foods.

Why did my country have a relationship where various communities could coexist peacefully and talk about each other's differences, but civil wars and violence have created refugees, and the factions have fallen to the point of hating each other like never before?

There are many reasons why this war happened: social, political, economic.

each had an impact

But one important cause has been overlooked and needs to be analyzed, because it determines whether we can avoid making the same mistakes.

The cause is architecture.

In my country, architecture has played a key role in creating, motivating, and amplifying conflicts between opposing factions, and perhaps in other countries as well.

There's a definite correlation between the social character of a region and the architecture that's there.

Architecture can make a big difference in whether a community is scattered or united.

Syrian society has long coexisted with diverse traditions and histories.

Syrians have experienced prosperity through free trade and sustainable communities.

I also felt a real sense of meaning and joy in being a local, and this was reflected in the built environment, where mosques and churches were built back to back, markets and public spaces intermingled, proportions and sizes determined in a way that respected and harmonized with each other.

These interwoven architecture can still be seen in the wreckage.

Syria's ancient Islamic cities built on a layered past, embraced the past and embraced its spirit.

So does the local community.

Living there and working with each other gave people a sense of belonging and made it their home.

There was a great sense of togetherness

But over the last century, the delicate balance of these places began to crumble, starting with urban development during the Occupation, when the French came to Syria, eager to reinvent the "unmodern city."

City streets were demolished and monuments were relocated.

Through what they called "improvements," it was gradually dismantled over a long period of time.

The urbanism and architecture that has long been ingrained in our cities, not in isolation, but in unity, cemented our sense of identity and belonging.

But over time, the old loses its value and the new becomes sought after.

Harmony between the built and social environments has been trampled underfoot in the name of modernity. Roughly constructed concrete block buildings, ill-maintained, unaesthetic and divisive urban planning have given rise to communities divided by class, creed and wealth.

The same thing is happening in the community.

Communities' lifestyles and senses of belonging also began to change to match the shape of the built environment.

Architecture, once a means of affirming a sense of togetherness and belonging, has now become a means of distinguishing one from the other, and all communities have begun to lose the buildings that once held them together and the local spirit that symbolized their coexistence.

There are many contributing factors to the Syrian civil war, but what should not be underestimated is that urban divisions and wrong and impersonal architecture have led to the loss of identity and self-esteem, and to the fostering of sectarian division and hatred.

Over time, the city transformed into a central city center and surrounding slums.

A cohesive community has broken up into individual social groups that have shunned each other and become distant from the land.

In my opinion, when you lose your sense of belonging to the land and the sense of sharing it with someone else, it quickly becomes fragile.

Perhaps the best example of this is the informal residential neighborhoods, where more than 40% of the population lived before the civil war.

So, before the war, about half of Syria's population lived in the slums. People lived in blocks of boxes that stretched out in underdeveloped suburbs.

This kind of isolated urban planning can easily breed the flames of war.

Conflict is more likely to occur in a compartmentalized place, because there are "others" around.

The things that once bound cities together -- the social ties that come from living in the same buildings, the economic ties that come from doing business in the same markets, the religious ties that come from living together -- those ties have been lost in the modernization of a visionless and wrongly built environment.

A little sideways

There are other cities in the world that are accepting of different peoples, such as cities in England, Paris, racialized streets in Brussels, and when I read about them, I can feel the kind of instability that we've seen here in Syria that is emerging.

We've devastated the city, Homs, Aleppo, Daraa, and many other cities, and now almost half of the population is displaced.

If the civil war ends successfully, the question that I ask as an architect is how to rebuild.

What Principles Should We Adopt to Avoid Making the Same Mistakes?

I think a particular focus should be on creating spaces where people feel they belong.

Architecture and planning must restore the traditional values ​​that once nurtured that consciousness: conditions of coexistence and peace, fostering a morality that fosters true aesthetic values ​​but is approachable and encourages tolerance and acceptance; architecture that benefits not only the elite, but everyone;

Homs has a completely destroyed district called Baba Amr.

About two years ago, there was a competition at UN-Habitat to rebuild this area, and I submitted this design.

It's a tree-inspired urban architecture that grows like a tree and spreads out organically, reviving traditional bridges over old alleys, housing apartments, private gardens, shops, workshops, parking lots, playgrounds, trees and places to cool off.

this is far from perfect

I drew it in a few hours when the electricity came on.

There are probably many other ways to express a sense of belonging and community through architecture.

But compare it to a city of independent, fragmented blocks, which was proposed in the official project to rebuild the Baba Amr district.

People's lives don't revolve around architecture, but architecture has the power to motivate and even move people to action.

In that sense, settlement, identity, and social integration are all part and parcel of effective urban modalities.

Cohesive urban styles, such as old Islamic cities and old European towns, encourage integration, while the multitude of inorganic houses and skyscrapers, even lavish ones, tend to deepen isolation and "otherness."

It's the little things, like the shade, the fruit trees, even the drinking water in the city that change how people think about a place.

In order to make it a "place to give", we must also give architecture.

the built environment is important

The architecture of our cities also shapes people's hearts.

Whether it's the concrete shantytowns around us, the crumbling social housing, the trampled old towns, the forests of skyscrapers, the quintessential modern urban architecture that has emerged across the Middle East is partly responsible for the division and fragmentation of our communities.

we should learn from this

We learn how to rebuild in a different way, how to create architecture that appeals not only to the practical and economic aspects of people's lives, but also to their social, spiritual and psychological needs.

Before the war, these needs were neglected in Syrian cities.

We have to create a city where the different communities that take root in it coexist.

Then people don't have to search for their own identity against the "others" around them, because that's everyone's home.

thank you

I am English

(Laughter) (Applause) I've never heard a word so sympathetic.

(Laughter) In the island nation where I was born, a lot of people have a history that spans the past 1,000 years.

It's a country that has historically forced other countries to change, but has been reluctant to change itself.

So this was a real shock to me. I woke up on the morning of June 24th to find that the UK had voted to leave the European Union, that the Prime Minister had announced his resignation, and that Scotland wanted to hold a referendum, and if things went wrong, the United Kingdom itself could disappear.

So it was a big shock to me, a big shock to a lot of people, but it was also an event that over the next few days caused a complete political meltdown in the country.

Some have even called for a second referendum, just like asking your opponent to start over after a sports game.

Everyone was blaming everyone but themselves

Blaming Prime Minister Cameron for deciding to hold a referendum in the first place

Blaming the leader of the largest opposition party for not doing its best

young people blame old people

Highly educated people blamed less educated people

Compounding this complete meltdown, the most tragic aspect is that xenophobic and racist public violence is escalating on a scale never before seen in my life.

Some people fear that our country will now become a little England, or, in the words of a colleague, that it will become an old-fashioned '50s theme park in the Atlantic Ocean.

(Laughter) But for me, the question is, was it really that shocking?

Did it happen all of a sudden overnight?

There may have been more deep-rooted structural factors that have led us to this point.

I want to pause here and ask two very fundamental questions.

First, what does Brexit mean, not only for the UK, but what it means for us all over the world.

What next can we do

I'll tell you what to do

First, what is Brexit?

Hindsight is very good

Brexit will teach us a lot about our society and about societies around the world.

It's made clear that we're embarrassingly ignorant about social divisions.

This time the votes were split on age, education, class and region.

Not many young people voted, but those who did wanted to remain.

Older people explicitly wanted to leave the EU

By region, London and Scotland were the strongest believers in staying in the EU, while the rest of the country was rocking.

We need to recognize and take seriously the existence of these divisions.

But if you think about it more deeply, this referendum reveals something about the nature of current politics.

Modern politics is no longer right-wing or left-wing

It's not just about taxes and budgets

globalization is the focus

The divide in modern politics is between those who welcome globalization and those who fear it.

(Applause) If we look at the reasons for those who wanted to leave -- we call them "leavers" as opposed to "remainers" -- the polls reveal two key issues.

One is immigration and the other is national sovereignty, both of which reflect people's dissatisfaction with life not being what they want it to be, and the feeling that politics is not a reflection of the will of the people.

But these ideas are also symbols of fear and alienation.

It means a retreat to notions of nationalism and national borders that many find hard to accept.

But the picture is much more complicated. Liberal internationalists, myself included -- and I'm very much aware that I'm part of that picture -- need to put ourselves in the big picture objectively to understand why we're here.

If you look at voting patterns across the UK, it's clearly divided.

Blue is Remain Red is Leave

When I saw this chart, what struck me personally was how little time I've spent in the red region in my entire life.

All of a sudden, I realized that when I looked at the 50 areas where Leave was the most dominant, I spent a total of four days in those areas since I was born.

In some of these areas, I didn't even know the names of the voting districts.

It really shocked me, and what it meant was that people like me, people who think they're receptive, open, tolerant, might think they know their own country and society, but they really don't.

(Applause) And here's the tricky part: we need to rethink how we talk about globalization to people who aren't like us. We need to recognize that for people who didn't necessarily have a college education, didn't grow up on the Internet, or didn't have the chance to get out of their hometowns, our demographics, which are mostly liberals, may not be as relatable or persuasive.

(Applause) It means that we need to reach out and understand a broader group of people.

During the Brexit vote, a minority opposition party trumpeted political fear and hatred to create lies and mistrust, such as the idea that Brexit might reduce the flow of refugees and asylum seekers to Europe, even though Brexit had nothing to do with immigration from outside the EU.

But for most Leave voters, the point was disillusionment with the government system.

For many, this was a protest vote, because they rejected the system of government because they felt that there was no politician to represent them, no political party to speak for them.

This is a phenomenon that we see all over Europe and in the liberal democratic world.

The growing popularity of Donald Trump in the United States, the nationalism of Prime Minister Orbán of Hungary, and the rising popularity of Marine Le Pen of France speak for themselves.

Brexit fears lurk in every society

The second question to ask today is how do we as a whole deal with this?

We urgently need a new vision for all those who believe in a free, open and tolerant society -- a vision of a more tolerant and inclusive globalization -- a vision that goes with others rather than leaving them behind.

Such a vision recognizes, first and foremost, the positive benefits of globalization.

The unanimous view of economists is that free trade, the movement of capital and the movement of labor across borders benefits everyone.

The consensus view of international relations scholars is that globalization leads to interdependence, to cooperation and to peace.

But globalization also brings with it the redistribution of wealth.

create winners and losers

To take the example of immigration, we know that the movement of people in all cases has a net positive effect on the economy as a whole.

But at the same time, we also need to know what happens as a result of the redistribution of wealth. Importantly, the migration of low-skilled workers will lead to lower wages for the poorest of our societies, putting upward pressure on house prices.

This doesn't detract from the value of human mobility, but more people need to share and recognize these benefits.

In 2002, former United Nations Secretary-General Kofi Annan gave a speech at Yale University on the theme of "inclusive globalization."

This word came from this speech

To paraphrase the story there, "If you want to keep the glasshouse of globalization safe, you have to keep the doors open to everyone.

Bigotry and ignorance are the ugly side of exclusive and hostile globalization."

The idea of ​​inclusive globalization had a brief resurgence in 2008 at an international conference on progressive governance attended by a large number of European leaders.

But in the midst of the 2008 financial crisis and austerity, the concept vanished almost without a trace.

Globalization has been incorporated as a rationale for neoliberal policy

It's seen as part of an elitist policy rather than something that benefits everyone.

We have to reclaim a much more inclusive sense of what globalization is today.

The question is how to achieve this

How can we strike a balance between dealing with fear and alienation while at the same time resolutely rejecting xenophobia and nationalism?

This is a challenge for each of us

As a social scientist, I believe that the social sciences are some kind of starting point.

It has to be a transformation both conceptually and materially. Here are my four ideas as a starting point.

The first is an idea related to civics education.

What stood out about Brexit was the chasm between public perception and proven reality.

Some say we've started a "non-factual" society, where evidence and truth don't matter, and lies have the same status as hard evidence.

So— (Applause) How can we restore respect for truth and evidence to our liberal democracies?

We have to start with education, but the first step is recognizing the deep chasm between consciousness and reality.

In 2014, the market research firm Ipsos Mori published a survey of immigration attitudes, which claimed that as the number of immigrants increased, societal attention to immigration also increased.

But the same survey also revealed a lot of misinformation and misconceptions that the public has about the nature of the immigration phenomenon.

For example, polls in the United Kingdom show that the actual asylum share of all immigration is much lower than people think, and at the same time, education-based immigration is a much higher share of all immigration than people think.

We need to address this misconception, the chasm between perceptions and reality about key elements of globalization.

We can't rely on school education for this, although it's obviously important to start educating early on.

Lifelong public engagement should be encouraged by all societies

The second idea is to encourage interaction between different communities.

(Applause) Of particular concern to me is the attitude of the British towards immigration.

For example, London, which has the largest number of immigrants, and the southeast of England, are by far the most tolerant.

The areas with the fewest immigrants are actually the most exclusionary and intolerant to immigration.

That's why we need to promote exchange programs.

Older generations, who may find it difficult to move around, need internet access.

Locally and nationally, we also need to promote people's mobility, people's participation, and interaction with strangers who may not necessarily subscribe to their values.

And the third thing that I think is extremely important -- and it's pretty fundamental -- is to make sure that everyone can benefit from globalization.

This graph, published in the Financial Times after Brexit,

It shows, gruesomely, that those who voted to leave were actually the most material beneficiaries of trade with the EU.

But the problem was that these people in these regions didn't see themselves as beneficiaries of the EU.

They didn't actually think they were making material gains from the increased trade and liberalization of movement in the world.

A large part of my research is refugee issues, but I have spent a lot of time preaching, mostly to the developing world, about the idea that to promote assimilation into our host communities, we must not only benefit the refugees, but also address the needs of the host communities.

But when you think about it, one of the desirable refugee policies is to provide disproportionately superior educational, health and social security services in areas of high immigration to meet the needs of the local population.

But while we encourage this response in the developing world of the world, we don't take the lessons home and apply them to our societies.

Moreover, if we are to really consider the need to ensure that people reap the economic benefits of globalization, our businesses and companies need a model of globalization that moves with them.

The fourth and final idea I would like to propose is that we need more responsible politics.

There is little social scientific evidence that compares people's perceptions of globalization.

But what we know from existing research is that one of the most striking differences between countries and over time is awareness and tolerance when it comes to immigration and migration versus free trade.

But one hypothesis that emerges from a quick look at this data is that polarized societies are much less tolerant of globalization.

Societies with centrist politics, like Sweden in the olden days and Canada today, where right and left wing forces work together, promote a sense of cooperation with globalization.

But what we see around the world today is a stark polarization, a lack of dialogue between political extremes, a lack of a liberal centre, an inability to promote two-way communication and common understanding.

At a minimum, even if it's difficult to achieve in the current environment, we must encourage politicians and the media to stop fear-mongering and become much more tolerant of each other.

(Applause) These ideas are tentative, but part of the reason is that this has to be an inclusive, shared project.

I'm British after all

and also European

and a global citizen

So to all of you who believe that these identities coexist within you, we must all work together to ensure that globalization moves with everyone and leaves no one behind.

That's where globalization and democracy can truly coexist for the first time.

thank you

(applause)

When looking back on 200 years of modern science

I have to admit that our grades aren't very good.

The machines we make repeatedly break down

The buildings we build cannot withstand large earthquakes.

But I don't think we should be too critical of the scientists, because they didn't have a lot of time.

200 years is not a lot of time. Nature has spent three billion years perfecting the wonders that we all want.

And don't forget that these materials have been certified for three billion years.

For example, a sequoia tree

It can support hundreds of tons of weight for hundreds of years, withstand cold weather, warm weather, and UV light.

When we looked at its structure with a high-magnification electron microscope to see what it was made of, we were surprised to find that it was made of sugar.

It's not the sugar you put in your tea

It's a nanofiber called a cellulose nanocrystal.

Cellulose nanocrystals are extremely strong, ten times stronger than steel per pound.

Even though it's made of sugar

Scientists around the world believe that nanocellulose will become one of the most important materials in any industry.

But there's a problem: I want to buy 500 kilos of nanocellulose to build ships and planes.

Whether it's Google or eBay or Alibaba

you won't find it even if you look for it

You'll find thousands of scientific papers, many wonderful papers, where scientists say that this material is wonderful and has many uses.

There are no companies that manufacture and sell

So we at the Hebrew University decided to work with our partners in Sweden to develop a process for producing nanocellulose on an industrial scale.

We certainly don't want to cut down forests.

So I looked for another source of raw material, and I found it, paper sludge from the paper industry.

I noticed this because there's a lot of it.

Europe alone produces 11 million tonnes a year.

If you stack them up to the size of a soccer field, you can create a 3,000-meter mountain.

That amount is emitted every year.

So for everyone, it's an environmental problem, but for us, it's a treasure trove.

Now, we're actually producing nanocellulose on an industrial scale in Israel, and soon we'll start producing it in Sweden.

You can do many things with this material.

For example -- if you add a small percentage of nanocellulose to cotton fibers, like the ones in my shirt, you can dramatically increase their strength.

That's why we can make amazing things like super fibers that can be used in industry and medicine.

that's not all

For example, you can build free-standing structures like the shelter you see here, which is currently on display at the Venice Biennale Architecture Exhibition.

The wonders of the natural world aren't just found in the plant world.

think of insects

Cat fleas can jump up to 100 times their body length.

it's amazing

In human terms, this is the equivalent of standing in the middle of Liberty Island in New York City and jumping to the top of the Statue of Liberty in a single jump.

We all wish we could have done that

How can cat fleas do that?

It turns out that this is actually due to an amazing substance called resilin.

Simply put, resilin is a protein, the most elastic rubber on earth.

It loses very little energy when stretched or squashed.

When you release your hand, click!

all the energy comes back

Anyone would want that kind of material

But there's one problem: cat fleas are hard to catch.

(Laughter) Because it jumps.

(Laughter) But it's enough to catch one.

And then you can extract the DNA, read how to make resilin, and clone it into an organism that doesn't jump much, like a plant.

that's exactly what we did

We can now produce large quantities of resinin.

Our team in college decided to do something really cool.

We decided to combine nanocellulose, the strongest substance produced in the plant kingdom, with resilin, the most resilient substance produced in the insect kingdom.

the results are amazing

This material is actually tough, stretchy, and transparent.

there's a lot you can do with it

Next-generation sports shoes that let you jump high and run fast

We can even make unbreakable touch screens for computers and smartphones.

One of the problems we have is the long-term placement of artificial implants in the body.

this is not a very good idea

because it breaks

Like plastic forks, artificial objects inside the body can fail due to lack of strength.

Conversely, it can be so strong that its mechanical properties do not match the surrounding tissue.

But the real reason lies deeper.

The reason for this is that in nature, no one puts my head in my neck or glues my skin to my body.

Everything in nature is self-organizing

All living cells, be they plants, insects or humans, have their nanobioblocks encoded in their DNA.

Most of them are proteins

Sometimes it's an enzyme that makes other substances like polysaccharides and fatty acids.

What all of these materials have in common is that they don't need others.

They recognize each other and build their own structures.

It develops into organs and creates life forms.

At the Hebrew University, about a decade ago, we decided to focus on perhaps the most important biomaterial for humans: collagen.

Why Collagen?

Collagen makes up 25% of the dry weight of the human body.

Apart from water, collagen is the most abundant substance in our body.

I've often said that almost anything that replaces a human being contains collagen.

Even before we started working on the project, there were a thousand kinds of collagen implants.

They can be as simple as hypodermic injections to eliminate wrinkles or plump lips, to sophisticated implants like heart valves.

So what's the problem?

the problem is the source

All sources of collagen are carcasses, pig carcasses, cow carcasses, and even human carcasses.

Safety is an important issue

not only that

Quality matters too

I'm personally very interested in this.

This is my father, Tzvy, at a winery in Israel.

A heart valve like the one I showed you earlier was implanted in my father's body seven years ago.

According to the scientific literature, such heart valves begin to fail about 10 years after surgery.

No wonder, because it's made of old, second-hand tissue, like this crumbling brick wall.

Of course, you can also pick up bricks and rebuild the walls.

But the result is not the same as the original

As early as 2007, the U.S. Food and Drug Administration is already advising companies to look for better alternatives.

that's exactly what we did

We decided to clone all five human genes involved in the production of type I collagen into genetically modified tobacco.

The resulting plant is able to produce brand new human collagen.

that's amazing

that's what's happening right now

Now we're growing it in 25,000 square meters of greenhouses all over Israel.

Farmers receive small tobacco seedlings

looks like regular tobacco but is involved in the production of type I collagen

5 human genes are integrated

We grow it for 50 to 70 days, harvest the leaves, and transport them to the factory in refrigerated trucks.

This is where collagen extraction takes place.

If you've ever made pesto, the process is basically the same.

(Laughter) If you crush the leaves and take the juice, that's where the collagen is.

The proteins are concentrated, taken to the clean room for final purification, and the collagen that is produced is exactly the same as in the human body, brand new, and then made into a variety of implants, such as the bone gap fillers used in severe fractures and spinal fusion surgery.

Recently, here in the European market, we introduced a fluid gel for diabetic foot ulcers, which is approved for clinical use.

this is not science fiction

it's happening right now

They're making plant-based implants that are replacement parts for the human body.

And we've recently succeeded in making collagen fibers, which are six times stronger than the Achilles tendon.

it's amazing

Together with our partner in Ireland, we're looking at the next step, which is to add resinin to this fiber.

The resulting super fiber has 380% higher strength and 300% higher elasticity.

So, strangely enough, in the future, patients who are surgically implanted with tendons and ligaments made from these fibers will be able to exercise better than they did before their injury.

As for future prospects

We will be able to industrially produce various nano-biomaterials produced by nature. Collagen, nanocellulose, resinin, and many others.

It will enable us to make high-performance, superior functional parts, including hearts.

This heart will be different than the one you get from an organ donor.

is better

Functionally better and longer lasting

My friend Shion Suliman once said something witty.

"If you want new ideas, unwrap old books."

If you ask me, the book is-

Written in 3 billion years of evolution

DNA of living things

All we have to do is read it and start making progress with this gift of nature.

thank you

(applause)

I am happy to be here

The fact that you're all here because it's a little weird

I'm glad that you're all here

When I say "here", I don't mean this venue.

not about this town

about here

is the earth

And when I say "everyone," I don't mean people in this room, but all life on Earth (Laughter), from complex to single-celled, from fungi and mushrooms to flying bears.

(Laughter) What's interesting is that Earth is the only place we know of that has life, with 8.7 million species.

We've looked elsewhere, maybe we haven't looked enough, but we haven't found it anywhere. Earth is the only place we know of that has life.

Is the Earth special?

This is a question that I've wanted to know the answer to since I was little, and I'm sure 80% of the people in this room had the same thought.

To know if there are any planets out there that can support life, either in our solar system or outside our solar system, we first need to know what life needs here.

Out of 8.7 million species, life only needs three things.

The left is the energy that all life on earth needs.

Complex organisms like us get their energy from the sun, but creatures that live deep underground may get their energy from things like chemical reactions.

There are many different energy sources available on the planet.

The right is the food or nourishment that all life needs.

This seems like a tall order, especially if you want fresh tomatoes.

(Laughter) However, all life on Earth derives its nourishment from just six elements, and these six elements are found on every planet in our solar system.

That leaves us with the most difficult condition in the middle.

I'm talking about water, not elk.

(Laughter) I think moose are lovely.

(Laughter) It's not frozen water, it's not gaseous water, it's liquid water.

This is what all life needs to live

And most of the bodies in our solar system don't have liquid water, so we won't consider them here.

Some bodies may have more liquid water than Earth, but they're trapped under ice shells, making them difficult to reach and difficult to know if there's life there.

Then there are only a handful left

to make matters easier

Let's just consider planets that have liquid water on their surface.

There are only three planets in our solar system that can be considered liquid water on their surface: Venus, Earth, and Mars, in order of proximity to the sun.

Because water is a liquid, it needs an atmosphere.

The atmosphere requires a fine balance.

If the atmosphere is too dense and too warm, it will be as hot as Venus, and liquid water cannot exist.

On the other hand, if the atmosphere is too thin and too cold, it will be too cold, like Mars.

Venus is too hot Mars is too cold Earth is just right

When you look at the footage behind it, it's self-evidently obvious where life could live in our solar system.

It's like the "three bears" problem in the fairy tale, and it's a simple story that even a child can understand.

However, I think there are two important points in the story of "The Three Bears" that people often don't pay attention to.

First, when Goldilocks arrived, Mama Bear's bowl was too cold.

Or was it just the right temperature at some point?

The answer depends on when Goldilocks entered the room.

The same goes for planets

Planets are not static, they change

will evolve

so is the atmosphere

Let me give you an example

this is my favorite picture of mars

It's not the most detailed, not the most aesthetic, not the most recent photograph, but it does show the presence of riverbeds carving the surface of Mars. Riverbeds are eroded by flowing liquid water. Riverbeds take hundreds of thousands of years to form.

It's something that can't happen on Mars today.

Today's atmosphere on Mars is too thin and too cold for liquid water to sustainably exist.

This one image shows that the atmosphere of Mars has changed, and it's changed a lot.

And before that change, there was a habitable state, because in the old days, the three conditions of life were met.

Where did the atmosphere that allowed liquid water to exist on the surface go?

One thought is that it has escaped into space.

Atmospheric particles gained enough energy to overcome the gravitational pull of Mars and flew into space, never to return.

This is what happens to any celestial body that has an atmosphere.

A comet's tail is a visible indicator of atmospheric dissipation.

But the atmospheres of Venus, Earth, and Mars also dissipate over time.

It's just different degrees and scales.

To explain this change in the atmosphere, we want to know how much the atmosphere is escaping.

Atmospheric particles have the energy to escape

where do you get it?

To make things a little easier, there are two ways.

one is sunlight

Light from the sun is absorbed by atmospheric particles, warming them.

(Laughter) Oh my God, I didn't even dance at my wedding.

(Laughter) By being warmed up, you have enough energy to get out of gravity.

Another way is to get energy from the solar wind.

Particles exhaled from the surface of the sun can travel through the solar system at blazing speeds of 400 kilometers per second, even faster during solar storms, and can travel through interplanetary space to reach planets and their atmospheres, providing energy for atmospheric particles to escape.

And that's what interests me, it's about habitability.

I said there are two things I want you to notice about the story of "The Three Bears," but the second one is a little more subtle.

If Dad's bowl was too hot and Mama's bowl was too cold, shouldn't Baby Bear's bowl tend to be even colder?

Even though I've always believed that, if you really think about it, the story may not be that simple.

Of course, the planet's distance from the sun determines its temperature.

This is about habitability

But there may be other things to consider

Perhaps the vessel itself influences the ending of the story about what is just right.

There are many differences between these three planets that can affect their habitability, but for the selfish reasons of my own research and the fact that I'm the one holding the remote control here, not you -- (Laughter) I'd like to talk a little bit about the magnetic field.

Earth has a magnetic field, Venus and Mars don't.

Deep inside the earth, a flowing liquid conducting material creates a large magnetic field that envelops the earth.

If you have a compass, you can tell which way north is.

Venus and Mars have no magnetic field

Even if you have a compass, you're bound to get lost.

(Laughter) Does this affect habitability?

how can it affect?

Many scientists believe that the magnetic field acts like a shield that protects the atmosphere, deflecting the particles of the solar wind away from the planet, like a force field against charged particles.

I think of it more like a salad bar sneeze cover.

(Laughter) My colleagues who watch this later will find that for the first time in the history of the field, the solar wind is equated with a runny nose.

(Laughter) So the Earth has been protected by a magnetic field for billions of years.

Maybe the air didn't escape

Mars, on the other hand, has no magnetic field and was left unprotected during that time, so much of its atmosphere may have been stripped away, transforming it from a habitable planet into what it is today.

On the other hand, some scientists think the magnetic field might act like the sails of a sailing ship, allowing more energy to be captured from the solar wind than the planetary body alone.

The sail of this magnetic field is

It might be harvesting energy from the solar wind, causing more of the atmosphere to escape.

It's an idea that needs testing, but we don't even know how effective it is and how it works.

Because it's well known that the energy of the solar wind is captured by the Earth's atmosphere.

The energy flows along the magnetic field to the poles, creating truly beautiful auroras.

it's really spectacular to experience

I know the energy is flowing

We're trying to measure how many particles are ejected and whether the magnetic field affects them.

I posed a problem, but I don't know the answer yet

I don't have the answer yet

We're working on how we're working on —

We're sending probes to all three planets.

Some are still orbiting, and MAVEN is orbiting Mars, which I'm personally involved in and directed here at the University of Colorado.

Designed to measure air outflow

We have similar data for Earth and Venus.

Once we have all the data, we can match it up to see how the three planets are interacting with the space environment around them.

We'll also find out if the magnetic field has important implications for habitability.

Why should I care?

i am very interested

Economically —

(Laughter) First, the answer to this question will tell us a lot about these three planets, not just how they interact with their environment today, but also how they were billions of years ago, and whether they were habitable in the past.

So we'll learn more about the atmosphere around us.

Not only that, but the knowledge we learn from these three planets can also be applied to the atmospheres of other planets, including planets in other star systems that we can now observe.

For example, the Kepler spacecraft, which is built and controlled here in Boulder, has been observing a region the size of a postage stamp in the sky for the last two years and has discovered thousands of planets in a region the size of a postage stamp that is no different from the rest of the sky.

In the last 20 years, I've gone from knowing no extrasolar planets to having so many that I don't know where to start.

Anything helps

In fact, Kepler observations and other data suggest that there are 200 billion stars in this galaxy alone, with an average of at least one planet per star.

Not only that, but it's estimated that between 40 billion and 100 billion of those planets will be habitable in our galaxy alone.

We're observing those planets, but we don't yet know which ones are actually habitable.

It's like being trapped on stage. (Laughter) I know there are other worlds out there, and I really want to know.

but i can't go yet

So if we take the tools we've developed for our familiar Venus, Earth, Mars, and apply them to other situations, and make rational inferences from the data, we'll be able to figure out which are the most likely candidates for habitable planets.

At least for now, this is our stage.

It's the only planet we know for sure that it's habitable, though we may find more soon.

But for now, this is the only habitable planet, our stage.

I am very happy that we are here

Thank you very much

(applause)

This is an artificial forest

It can span many hectares, or it can be built in a small space, like the size of your own garden.

Each of these artificial forests is only two years old.

Also in my backyard

Excellent biodiversity

(Birds chirping) Every morning I wake up feeling like a Disney princess.

(Laughter) I'm an entrepreneur, and my job is to create forests like this.

My business builds artificial forests in factories, farms, schools, residential resorts, apartment buildings, public parks, even zoos.

A forest is not a single piece of land where animals coexist.

It can also be an essential part of urban areas.

For me, a forest is a place with trees that are too dense for people to enter.

size doesn't matter

The world we live in today was once a forest

This is before humans invaded.

And we've turned forests into cities -- in São Paulo, for example -- and we've forgotten that we humans are part of nature, which is home to 8.4 million species on Earth.

Human habitats are no longer natural

But that's changing little by little.

I've teamed up with a few friends to build artificial forests everywhere and everywhere as a business.

I am also an industrial engineer

I specialize in making cars

I used to work at Toyota, where I learned how to turn natural resources into products.

For example, we squeeze the sap out of rubber trees and turn it into natural rubber to make tire products.

But products like this will never return to natural resources.

We've partially taken out the elements of nature and made them irreversible.

that is industrial production

Nature, on the other hand, works in exactly the opposite way.

It combines atoms one by one to create something else.

All natural products return to natural resources

This is what I learned when I planted a forest in my backyard.

This was the first time that I did something with nature instead of against it.

Since then, we've created 75 forests in 25 cities.

Every time I set out to work on a new piece of land, I realize that all the ingredients needed to create a forest are right at my fingertips.

There's just one thing to do, put together what you have, and let nature do the rest.

Forest building starts with soil

By touching, feeling, and eating, we identify the ingredients that are missing in the soil.

If the composition of the soil is fine, it will be compact enough to prevent water from soaking in.

We mix organic matter around us to make it more permeable.

This will finally allow the water to seep in.

If the soil doesn't hold water, add organic matter and mix it with water-absorbing materials such as peat or plant fibers called bagasse to help the soil retain moisture and stay moist.

Plants need water, sunlight and nutrients to grow.

What to do if the soil is nutrient-poor?

Do not directly feed

Then it's the same as industry

contrary to nature

So instead we add microbes.

Microorganisms naturally produce nutrients in the soil

It feeds on the organic matter in the soil, so it just eats and multiplies.

As the microbes multiply, the soil resumes breathing.

the soil comes alive

In my business, I also research the native woody species of the land.

How to tell if it's native or not?

The answer is that anything that existed before the human invasion is native.

it's a very simple rule

It's also my job to survey national parks and look for survivors of natural forests.

We also survey sacred groves and forests around temples.

If I don't find anything there, I go to the museum and look for wood and seeds from trees that existed long ago.

By studying old local paintings, poems and literature, we identify the types of trees that belong to the area.

Once we know the species, we divide them into four layers: the shrub layer, the sub-tree layer, the tree layer and the canopy layer.

After determining the proportions of each layer, determine the proportions of each type of tree to be planted.

If you want to create a forest centered on fruit trees, increase the percentage of fruit trees.

You can create a forest that's full of blooming flowers and attracts lots of birds and bees, or it's simply a forest of native evergreens.

Collect the seeds, germinate them, and grow them into seedlings.

We try not to plant trees that belong to the same layer next to each other, because as they grow taller they will compete for space at the same height.

Collect and plant saplings nearby

Cover the surface with a thick layer of mulch to keep the soil moist even in hot weather.

When it's cold, it's only the mulch that gets frost, so even in extreme cold, the soil remains breathable.

The soil is so soft that roots can easily penetrate the ground and grow quickly.

Even if it doesn't look like it's growing at first, the forest is growing underground.

In the first three months, the roots reach a depth of about one meter.

These roots form a mesh that holds the soil in place.

Microbes and fungi thrive in this web.

So even if there is no nutrient around the tree, the microbes can provide it.

If it rains, mushrooms will magically grow overnight.

This means that there is a healthy mushroom web underground.

Once the roots are established, the forest will begin to grow above ground.

During the two to three years that the forest grows, watering is continued by hand.

I want to send water and nutrients only to the trees that are growing, so I pull out weeds.

The more the forest grows, the more it blocks the sunlight.

By the end, the trees are so dense that the sunlight doesn't reach the ground.

Then the weeds that need sunlight won't grow.

At this stage, not a single drop of water that falls into the forest evaporates back into the atmosphere.

This dense forest condenses the moist air and keeps it moist.

I'm going to gradually stop watering here.

And even without watering, the forest floor can remain moist and dark.

Now, as soon as even one leaf falls off here, rot begins.

This decaying organic matter creates humus, which is food for the forest.

As the forest grows, it sheds more leaves and creates more humus, which means more food for the forest to grow.

and the forest continues to grow rapidly

Once the foundation is laid, this forest will regenerate over and over again, perhaps forever.

No management is suitable for a natural forest like this.

turn into a small jungle party

(Laughter) This artificial forest grows as a community.

If each tree of the same species were planted individually, it wouldn't grow as quickly.

This was how we created a 100-year-old forest in 10 years.

thank you

(applause)

"Mom, who are these people?"

It was an innocent question when my daughter, Aria, was about three years old.

I was with my husband in a big shopping mall in Abu Dhabi.

My daughter was staring at a large poster towering over the mall.

It belonged to three heads of the United Arab Emirates.

When my daughter came up to me, I bowed down and explained, "These are the people who worked hard to develop the country and bring it together - they're the chiefs."

Then she said, "Mommy, why aren't there pictures of great women on the walls where we live and at Grandpa and Grandma's in Lebanon?

You mean women don't matter? " said

I think that was the hardest question I've ever answered as a parent, and one of the hardest questions I've ever answered in my 16+ years of social work.

I grew up in Lebanon. I had an older sister. My father was a hardworking pilot and director of operations for a Lebanese airline. My mother and grandmother were homemakers and were always there to support us.

My father encouraged me and my sister to pursue higher education, despite the fact that our culture at the time dictated that career ambitions should be made by boys, not girls.

I was one of the very few girls of my generation who left home at 18 to study abroad.

He didn't have a son, so in a way, I became that person.

Now, decades later, I'd like to think that I've done well enough that my father can be proud of his son.

Having a BA and PhD in electrical engineering, R&D in the UK, and consulting in the Middle East, I've always been in a male-dominated environment.

I'll be honest, I've never met a role model that I can look up to.

My mother's generation didn't care about getting ahead in society.

I had some men who were very supportive, but no one knew about the responsibilities and pressures I was facing, especially after having two children.

Western women want to advise poor oppressed Arab women, but they live different lives with different constraints.

Arab women of my generation had to set an example for themselves.

They have more work to do than Arab men and have faced more cultural conservatism than Western women.

As a result, I think we, poor oppressed women, have stumbled upon practical lessons worth sharing, perhaps useful for anyone who wants to thrive in modern society.

Three lessons from me

[Turn "fucking" events into fuel] (Laughter) (Applause) There's one word that everyone says is the key to success: resilience.

So what is resilience and how do we nurture it?

I think of resilience as the ability to turn bad things into fuel.

At a job long before my current job, I worked with a man, let's say John.

I worked very hard with John, and I hoped that eventually he would realize what I was capable of and help him move up the corporate ladder.

In addition to completing consulting projects, I was also passionate about research on women's economic empowerment.

One day, I had the opportunity to give a lecture to MBA students about my research.

John was also in the auditorium, hearing the details of my research for the first time.

As the presentation progressed, I saw John in the corner of my eye.

His face was bright red, and he was slumped in his chair, clearly ashamed.

To the applause, I finished my presentation, and we hurried into the car.

Then John let out an outburst of anger.

"What the hell was that thing just now!?

You're a consultant, not an activist! ”

I said, "John, I don't understand

I wasn't just telling you some research findings about the gender education gap index and Arab countries.

It's true that our index is currently at the bottom of the list, but we're not saying it's not true, are we? ”

The answer that came back was "All the premises of your research are wrong.

What you are doing is dangerous and could destroy our social fabric."

John paused for a moment, and then added, "When a woman has children, home is where she belongs."

It felt like time had stopped for a long time, and my confused head was full of things like, "I wish I could forget about careers.

Absolutely impossible."

It took me a few days to fully digest this event and its implications, but once I did, I came to three conclusions.

First, this is John's problem and his complex.

There are many such people in society, but never own their problems.

Second, we need new sponsors, and soon.

(Laughter) I found a sponsor, and he was a really nice guy.

Third, I wanted to show John that I was successful as a mother and father.

I apply this lesson in my personal life as well.

As I've built my career, I've received many words of encouragement, but I've also frequently encountered women, men, and couples who clearly disagree with me and my husband's decision to work together.

At family gatherings and friends gatherings, it's probably not meant to be offensive, but there are couples who don't hesitate to say things like, "You know you're not a good mom, you know, you're so busy with work."

It would be a lie if I said I wasn't hurt by these words

My children are the most important thing to me.

But, just like John, I quickly realized that these people had their own problems and complexes.

So instead of saying it back, I gave it my best smile, because I saw this sign glowing in my mind.

[Show me how happy you are.] (Applause) As a young woman, in a situation like this, you have only two options.

Either you take in the negative words that are thrown at you and make you feel like a failure because of it, and success is never within your reach, or you choose to recognize the negativity of others as their problem and turn it into your own fuel.

I've learned to always choose the second option, and I've found that it brings me one step closer to success.

As the saying goes, success is the best revenge.

Some women in the Middle East are "lucky" to marry men who encourage them to work.

Correct me, I should say "wise." Who you marry is your choice, and if you're thinking about working long hours, you've got to marry someone who supports you.

Even today, Arab men do not share the household chores equally.

It's just that society doesn't expect you to be masculine, and you'll even get a cold eye.

A society that assumes that Arab women should be happy and successful with their husbands and children as the first condition of their happiness.

The idea that women exist for their families.

Change is happening, but it will take time

At the moment, working Arab women have to somehow keep their homes in perfect order, take care of all their children, and juggle busy work.

I've learned the hard way that in order to do this, I need to apply my hard-earned professional skills to my personal life.

make life work

i'll show you what i'm doing

A feature of Middle Eastern families is that most families have affordable domestic helpers.

The problem is how to hire good people

It's the same with choosing people at work, but based on solid recommendations, I chose people who would look after my children while I was at work.

Christina worked for my sister for four years and the quality of her work was impeccable.

Aria has been working in our home since she was six months old and is now an integral part of our family.

While I'm at work, she's taking responsibility for the house. I'm trying to help Christina and my children reach their full potential in the best possible way.

This lesson applies to any form of childcare, whether it's a live-in sitter, a daycare, or a part-time nanny who works in another home.

Choose very carefully and let them exercise their power.

When I look at my calendar, every day I work, one and a half hours between 7:00 and 8:30 p.m. UAE time is always "family time."

this is a sacred time

I've been doing this since Aria was a baby.

I do what I can to honor this time. I get home on time and spend quality time with my kids.

When I'm on the road, no matter what time zone I'm in, I use Skype to connect with my kids from a distance.

My five-year-old son, Buhan, is learning how to read and basic math.

One more confession, it turns out that my daughter is actually a much better teacher for my son than I am.

(Laughter) At first, it was just pretend play, but Aria really liked the role of the teacher, and as a result, we realized that not only did Buhan's literacy and Aria's sense of responsibility increase, but the bond between siblings grew stronger, and everyone benefited.

Every successful Arab woman I know has found their own way of making life their own business, because they continue to play the biggest role in the household.

This is not just about juggling the dual roles of career woman and mother.

It's also about living in the moment to the fullest.

I try to keep work out of my life when I'm with my kids.

Instead of worrying about how many minutes you can spend with your kids each day, focus on making this time memorable. Spending time with them, listening to them, connecting with them.

[Don't join forces and compete] Arab women of my generation weren't in the public eye growing up.

I think this explains why there are so few women in politics in Arab countries.

The advantage is that we've spent a lot of time developing behind-the-scenes social skills in the coffee shop, in the living room, on the phone -- the social skills that are so important to success, networking.

I would say that the average Arab woman has a large network of friends and acquaintances.

the majority are also women

In the West, ambitious women often compare themselves to other women and seem to want to be perceived as the most successful of all.

This leads to a much-reported competitive attitude among working women.

If you can only have one woman at the top, you can't bring others in, much less lift them up.

Arab women generally don't fall into this psychological trap.

We've learned that facing a male-dominated society and helping each other is in everyone's interest.

In my previous job, I held the highest position among women in the Middle East, and it's not uncommon to think that focusing on networking with female coworkers isn't going to be very profitable here, and that you should spend more time building relationships with your male bosses and coworkers.

But two of my biggest career advancements have come through the support of other women.

First, the head of public relations suggested that I be considered for the role of Young Leader at the World Economic Forum.

He was very knowledgeable about my media relations and the articles I wrote, and when asked for my opinion, he mentioned me by name.

And a friend, a female Saudi consultant, helped me market my first project in Saudi Arabia, which I found to be a difficult market for women.

He introduced me to a client, which was the beginning of many projects in Saudi Arabia.

I currently have two female managers on my team, and I believe their success is key to my own success as well.

Women keep moving forward in the world, not fast enough, but they're moving.

Arab countries have also made progress overcoming some of the obstacles of recent years.

Just this year, the UAE appointed five new female ministers to its cabinet, bringing the total number of female ministers to eight.

That's nearly 28 percent of the cabinet, more than in many developed countries.

This photo is my daughter Aria's current favorite.

This is undoubtedly the result of great leadership, but it's also the result of strong Arab women who never give up and push the boundaries.

It's the result of Arab women, like me, working every day to turn their pain into fuel and not take their work into their personal lives, making their lives their work, working together rather than competing with each other.

In the future, my hope is that 20 or 30 years from now, when she stands on this stage, she will be as proud of being a mother as she is of her father.

As for my son, I hope by then words like "mother's boy" will have completely changed their meaning.

thank you

(applause)

this girl is my niece

my name is yari

9 months old

My mother is a doctor and my father is a lawyer

By the time Yari goes to college, her parents' work will have changed dramatically.

In 2013, researchers at the University of Oxford conducted a study about the future of work.

They concluded that one in two jobs are at high risk of being automated by machines.

Machine learning technology is a major driver of that change.

This is one of the strongest areas in artificial intelligence.

This technology allows machines to learn from data and do certain things like humans do.

At my company, Kaggle, we work on cutting-edge machine learning technology.

We bring together hundreds of thousands of experts to solve important industrial and academic problems.

And that gives us a unique insight into what machines can and can't do. What jobs are at risk of automation or disappearance?

Machine learning began to be used in industry in the early 1990s.

It started with relatively simple tasks.

Things like assessing the credit risk of loan applications and sorting letters by reading handwritten zip codes.

Over the last few years there has been tremendous progress

Machine learning is now capable of much more complex tasks.

In 2012, Kaggle presented the professional community with the task of creating an algorithm that could grade essays written by high school students.

The winning algorithm was able to give a rating that matched the human teacher's scoring.

Last year, we put out an even more difficult challenge.

"Can we diagnose diabetic retinopathy from a picture of an eyeball?"

Again, the winning algorithm produced results consistent with the human ophthalmologist's diagnosis.

Given the right data, machines are beginning to outperform humans on tasks like this.

A teacher might read 10,000 essays in a 40-year career.

An ophthalmologist might diagnose 50,000 eyes.

But a machine can read millions of essays and examine millions of eyes in a matter of minutes.

Humans are unlikely to beat machines for frequent, data-intensive tasks.

But there are things we can do that machines can't.

Where mechanical technology has barely progressed is the art of making decisions in inexperienced situations.

Machines can't handle situations they've rarely seen before.

A fundamental limitation of machine learning is that it has to learn from large amounts of historical data.

humans are different

We can piece together clues that have little in common to solve unseen problems.

Percy Spencer was a physicist on a mission to develop radar during World War II when he realized that magnetrons melted chocolate bars.

By combining his understanding of electromagnetic waves with his knowledge of cooking, he invented -- do you know what? it's a microwave

This is a great example of creativity.

These interdisciplinary ideas, in their most trivial form, strike us thousands of times every day.

Machines can't beat humans in inexperienced situations, and that puts a fundamental limit on how machines can automate what humans do.

What does this mean for future work?

The fate of each job's future depends on the answer to one question: How much of it can be reduced to high-frequency, high-volume data processing?

Machines are getting smarter and smarter when it comes to high-frequency, high-volume data processing.

Machines now grade essays and diagnose certain diseases.

In a few years, we'll be able to do audits and interpret common phrases from legal contracts.

But that doesn't mean you don't need an accountant or a lawyer.

Complex tax planning and unprecedented lawsuits require it. Machines leave only the capable.

It's getting harder to get these jobs

Now, as I said before, we haven't progressed in technology to deal with situations we haven't experienced.

Claims in marketing activities must attract the attention of consumers

you have to stand out in the crowd

Business strategy is about finding market niches that other companies aren't doing.

It's humans who create marketing pitches, and it's humans who come up with business strategies.

That's why, Yari, whatever you choose to do, try new things every day.

That way you'll be ahead of the machines.

thank you

(applause)

Let's say you're in product development.

I've designed a product that's never been done before, and it's called the "human immune system."

You suggest this product to your skeptical, serious boss.

Let's say your name is Bob

Around you too There's about 1 people, right?

What will happen?

Bob, I have a great idea for a whole new kind of personal health product.

named the human immune system

You have a difficult face

But don't worry, I know it's complicated.

I'm not going to go into too much detail, I just want to share some of the cool features of this product.

First, the product cleverly uses "redundancy." It has millions of copies of each component, white blood cells, white blood cells, etc., before they're actually needed, giving them a lot of headroom in case of an unexpected eventuality.

And what's even more amazing is that there's also diversity. It's not just white blood cells, it's B cells, T cells, natural killer cells, the immune system.

it doesn't matter what's in there

What's important is that together, they allow for a wide variety of approaches, capable of doing just about anything that evolution can do.

This product is also completely "modularity"

We have a superficial barrier called the skin, we have an innate immune system that responds quickly, and we have an adaptive immune system that is very targeted.

What's important here is that if one system can't handle it, the others will cover it, effectively making it a perfect system.

Please do your best to follow me, Bob.

There is "Adaptation"

We can actually create an immune system that can fight against antigens that we've never even encountered before.

Also noteworthy is the "prudence" in doing this, finding and dealing with every small threat, and even remembering past threats for the possibility of encountering them again in the future.

The product that I propose today is actually not used by itself.

It's "Embedded." It's embedded in the larger system of the human body. This product works in harmony with existing systems to create an unprecedented level of biological protection.

So Bob, be honest, what do you think of this product?

And Bob would say, I really appreciate the effort and the passion you put into this presentation.

From what I've heard, your product's selling point seems to be inefficiency and complexity.

Have you learned the 80–20 rule?

And you say this product is in silos.

Designed to overreact and create new things for the benefit of others

I'm sorry, but I don't think you'll succeed.

If we go along with Bob's ideas, we can create a more efficient immune system.

Efficiency is always important in the short term.

Simple, efficient, and more than worth the money

You wouldn't say no to such a product, would you?

Unfortunately, there's a very, very, very small problem, and everyone who uses this product, and I probably will die in less than a week when winter comes, just by encountering a new strain of the flu virus.

My first interest in the relationship between biology and business, and longevity and resilience, was when I was asked a very unusual question by the CEO of a global technology company.

The question at that time was, "What do you think is necessary for our company to last for 100 years?"

It sounds like an innocent question, but it's a little harder than you might imagine, because the average life expectancy of a public company in the United States is only 30 years.

That's not even half the lifespan of the people who work there.

As the CEO of such a company, if you're harassed by investors and overwhelmed by change, you may not be blamed for not worrying about the future 30 years from now.

But this might keep you up at night, the chances your company won't last even five years, an average of 32 percent, which is unbelievable.

That means there's a one-in-three chance that the company will be taken over or go bankrupt within five years.

Now back to the tech company CEO question.

It's best to ask the natural world for these stories, because they've been living and dying longer than any company.

As a pseudobiologist, I immediately decided to contact a real biologist, my friend Simon Levin, a professor of biology and mathematics at Princeton University.

With him, we explored every system in the living world, from natural rainforests to man-made forests and fisheries.

And I asked, What makes these systems resilient and durable?

The answer we found is that it's a constant repetition of those six laws, the laws I just talked about that underpin the miracles of the human immune system, from redundancy to integration.

In fact, this principle can be found not only in long-lived biological systems, but also in long-lived social systems, such as the Roman Empire and the Catholic Church.

We delved into business, and found that the exact same principles were found to be the hallmarks of a resilient, enduring business that, in its absence, were short-lived.

So let's start by looking at an example of a corporate immune system failing.

This beautiful building is part of Shitennoji Temple and is located in Osaka, Japan.

In fact, it is one of the oldest temples in Japan.

It was built by Korean craftsmen because there were no temples in Japan at that time.

These craftsmen started a company to build temples.

Amazingly, this company, Kongo Gumi, lasted 1,428 years.

In fact, it's become the world's oldest surviving company.

What is the current state of the Kongo-gumi?

Unfortunately I am not happy

During the bubble economy in Japan, I borrowed a lot of money to invest in real estate.

I couldn't pay back the loan because the bubble burst.

The company went bankrupt and turned itself over to a major construction company.

Unfortunately, after 40 generations of the Kongo family's prudent management, the Kongo Gumi failed because they made the mistake of not applying the principle of prudence.

When it comes to corporate failures, Kodak is probably the most famous one, when it announced bankruptcy in January 2012.

What's more interesting is how did Fujifilm manage to survive and thrive, with the same products, the same digital pressures, and the same time period?

Fujifilm has applied its expertise in chemistry, materials science and optics to a wide variety of fields, from cosmetics to pharmaceuticals to medical systems to biomaterials.

Of course, I failed in some areas.

But overall, I've adapted my portfolio well enough to survive and grow.

As Fujifilm CEO Shigetaka Komori put it, the strategy worked because it had "more pockets and drawers" than its rivals.

I think what he means is that he created more options than his rivals.

Fujifilm survived because it applied the principles of thoughtfulness, diversity and adaptability.

In one night, the devastating factory fire you see devoured the only factory that supplied Toyota with valves for automotive braking systems.

It's the ultimate test of resilience

Car production itself came to a sudden halt.

So how did Toyota revive car production?

How long do you think it took?

it's only five days

It takes 5 days to completely recover from a state where there is no brake valve at all.

How did you do it?

Toyota has built strong partnerships with its suppliers, and Toyota's quick action allowed it to work with multiple suppliers to redirect production capacity to the missing brake valves and resume production of the car.

Toyota has used this principle of "modular" supply networks, "embedded" into integrated systems, and -- functional "redundancies" to smoothly divert existing capacity elsewhere.

Fortunately, not many companies go out of business in a devastating fire.

But what you see in the newspapers every day is companies that are going out of business because of disruptive technology.

So how does eyeglass lens giant Essilor not only avoid disruptive technology, but profit from it?

Yes, disruptive technology is not a problem unique to the software and electronics industry.

Essilor carefully examines the competitive landscape to identify potentially disruptive technologies.

So you buy those technologies very early, before they get too expensive, before there's a bunch of competitors, and then you develop those technologies yourself, even at the risk of failure and self-destruction.

Essilor has been doing great things by staying ahead of others, for more than 40 years, using the principles of thoughtfulness and adaptability.

Okay, so if this principle is so powerful, why isn't this common sense in business?

Why don't we hear this word often?

Change must start from within

Remember my pitch to Bob: To apply the miracle-based principles of the human immune system, we first need to change the way we think about business.

We usually have a "mechanical way of thinking" when we think about business.

We set goals, we analyze problems, we make plans, we execute them consistently, and we prioritize efficiency and short-term results above all else.

But don't get me wrong, this is a really practical and effective way to tackle relatively simple problems in a relatively stable environment.

This is how we handle most of the problems that Bob, and probably many of us, including myself, face every day.

In fact, it was a pretty good mental model for business on the whole -- maybe until the mid-'80s, when globalization and the revolution in technology and telecommunications made business more dynamic and unpredictable.

But what about the many more dynamic and unpredictable situations we face today?

In my opinion, in addition to the mechanical way of thinking, we need to master the biological way of thinking, represented by six principles.

In other words, we need to be more humble and sensitive about when and how to direct, not control, complex and uncertain situations.

Something similar is throwing a ball and releasing a bird.

A ball will go straight to its target, but a bird won't.

What do you think?

Is it considered a little impractical and theoretical?

Actually it's not

Every small startup thinks and acts naturally and biologically.

why?

Because we don't have the resources to forcefully change the environment around us.

They're constantly thinking about the survival challenges of startups that don't have the scale to accommodate change.

The irony, of course, is that all big companies used to be small startups.

But over time, many companies have lost the ability to think and act biologically.

We need to rejuvenate our natural ability to think biologically, so we can survive in today's harsh environment.

So let's not just think about short-term results.

Even the companies I know actually spend a significant amount of time thinking about the central question of their strategy: "Are we ahead in this game?"

In addition to that, let's consider another, more biological, but equally important question: "How long will this game go on?"

thank you

(applause)

I'm here today to tell you all that I'm here by chance.

I truly believe that being at TED isn't about -- but that I'm in this environment at this point in my life by chance.

But what I want to talk to you about today is using technology, but what I want to talk to you about today is how you can use technology to make these kinds of coincidences happen more often.

Because I really think technology played a big part in how this coincidence made me who I am today.

I'm going to tell you a little bit about myself today because I want to give you context.

By doing so, you will understand why my two greatest passions right now are children and education.

And after I've said that in context, I'm going to talk a little bit about technology, and why we believe in its incredible potential.

And then I'll tell you about AMD's decision to launch the 50x15 initiative, as Chris introduced me.

And then I'll go back to the beginning and tell you a little bit more about my belief that in today's world, it's really important for business leaders to have a passion for something meaningful, not just their own business.

With this in mind, let me begin with this story. I am the oldest of five siblings, the other four are women.

I grew up in a household with only women.

I'm pretty sure - you know

(Laughter) Now, as you can imagine, I was born in a very small village in Mexico, and unfortunately, very poor, even though my parents didn't have a college education.

Fortunately, me and my four sisters were able to go to college.

When you say that, it shows that your parents valued education.

My parents were enthusiastic about learning, and we'll come back to that later.

But my exposure to learning from an early age, and my curiosity so abundantly cultivated throughout my childhood, was also due to one technology: the Victrola.

My father found it in a junkyard, fixed it, got it working, and for some reason -- now that I think about it, I don't know why he was so knowledgeable about what was going on in the world -- he asked me, who was very young, to sit by my side, and I put a Mozart record on Victora, and he told me how Mozart was the most romantic classical composer ever. was the experience of touching

My father explained to me about Johann Strauss and how he composed his waltzes and became world-famous.

He also taught me a little bit about history. Listening to Tchaikovsky's "1812" in his little Victrola, my father would tell me about the country of Russia, what was happening in Russia at the time, and how this song represented that history.

My father instilled a lot of curiosity in me when I was still a child.

You don't see this as a high-tech gadget, but when it came out in the mid-'40s, it was one of high-tech for my father.

And one of the really important things to take away from this experience is that people often ask me, "How did your parents treat you as a child?"

I always answer, "It was really hard."

It's tough in the way most people think of it -- not being yelled at or punched.

That's what I mean, until I grew up, my parents always told me that I should never forget the following two things: they are very important.

First, "When you go to bed at night, look back over your day and see if you contributed or did your best that day."

The second thing my parents said was this: "I believe in you, wherever you are, wherever you go, you will always do the right thing."

How many of you say to your child, and if so, it's true. That's the biggest pressure you can put on your child. (Laughter) "We trust you to always do the right thing."

(Laughter) And I've been very, very careful. Technology, of course, has to be useful, accessible, and affordable.

In today's world, useful and affordable and accessible doesn't necessarily apply to many existing technologies.

So our company's and my personal passion is to work hard to make technology useful, accessible and affordable.

for me it's incredibly important

Now technology has changed a lot since Victora's time.

we now have very powerful computers

The Internet is called the killer application

Frankly, we don't think so.

The Internet is really about connecting people and ideas.

The Internet is simply a medium for connecting people and ideas.

The ability to connect people and ideas is amazing.

So through this change, we are facing a momentous opportunity today.

If we could bring people and ideas together more strongly -- but there are too many products on the market today, the key question for me is: How many of these products are useful, accessible, affordable connections? Are we providing accessible and affordable connections? Regardless of your financial standing to own this technology, or your ability to buy it, right?

When we looked at this, we wanted to come up with a little more vision of how we could make it happen.

So a few years ago at AMD, this idea was born, the 50x15 initiative, where the goal is to connect half the world to the Internet by 2015, connecting people and ideas.

I never thought we could do it alone. I never meant to say that.

I always felt that this would not be possible without partnering with governments, businesses, educational institutions, myriad companies, even rivals.

So this is a really lofty idea, if you think about it. So this is a really lofty idea, if you think about it.

I'll come back to this in a moment, because the results so far have been remarkable, and what I'm really looking forward to is what will happen in the eight years to 2015. What will happen in the eight years to 2015?

What is the current situation?

This is an annual change Source: Gapminder.com Our friends

If you haven't seen this site before, please do so. It's very impressive. You can see how Internet penetration has changed over the years.

There are three things that this number reveals about our goals for 2015.

The first is that the Western world, primarily Western Europe and the United States, has made tremendous progress.

Connectivity in these countries is staggering and continues to grow.

In fact, it's even possible that it won't take until 2015 to reach 100 percent. Emerging countries like India and China are making strong progress, but progress is much slower in less developed countries like Africa and Latin America. In fact, I recently visited South Africa.

I had the opportunity to have a discussion with President Mbeki, and one of the things we discussed was what exactly is holding us back from speeding up our connectivity goals.

One answer is that in South Africa, a broadband connection costs 100 dollars a month.

At this cost, even in the United States, we won't be able to reach the connectivity target we're aiming for.

So we discussed how we could bring down the cost of this technology by getting collaborators.

If you look at this table, this graph is logarithmically on the horizontal axis. Look at the very end, 50 percent connectivity in 2015 is a long way off.

we are excited and motivated

I think that's what drives things. It's the force that makes us do things differently. And what we're looking forward to is working with our many partners around the world to achieve this goal.

Now, about the 50x15 initiative, I want to explain one thing, and it's really important, but this is not a charity.

Efforts as a business

Let's take a look at one small segment that exists in the unconnected world: the education market.

If you think about elementary school students, if millions of children around the world can be connected, the benefits would be huge.

So we decided to start a business that fits the needs of this segment.

Right from the very beginning when we started this project, we've been very clear: this is not a charity.

In terms of business operations, this has been a very tricky part of this segment.

In the last three years, I've learned that in this segment, and in the developing world, there is a demand for incredibly high quality, reliable, very low cost access.

The focus of this initiative is simple, accessible and human-centered solutions.

What this means is that the PC was invented roughly in 1980, and in the 20-odd years since then, it hasn't really changed.

In most places, PCs are gray or black boxes, and they all look the same.

And frankly -- some customers get mad at me for saying this, but the truth is, if you take the label off the top of your PC, you won't be able to tell which manufacturer it is from, because it's highly commoditized.

So the human-centered approach wasn't there, but that's what this segment needs, so it's absolutely important to think about it.

One of the talks I heard this morning was about an operating room machine designed for Africa.

What we're talking about here is something very similar to that.

It's the need for a geographically tailored approach.

What this means is that there are some regions in the world where governments play a central role in the development of technology.

Some regions are not

Some regions have well-developed infrastructure to support the manufacturing industry Other regions have well-developed infrastructure to support the manufacturing industry

There are some regions that don't have it, so we need to develop technology and put it into practice according to local circumstances.

And finally, and very importantly -- this is our opinion, and it's not universally shared, or maybe it's just us -- we believe that the greatest success of this initiative requires a locally-based, integrated and comprehensive ecosystem model.

Let me use this example, it's the Republic of South Africa, because I've been there recently, so I'm somewhat familiar with some of the issues in this country.

This is an emerging country with a population of 45 million.

Big growth is starting

The country aims to bring down the cost of internet connectivity.

There is a company that manufactures PCs in Japan.

Universities are also setting up training environments for software development.

It's a great, ideal place to build the hardware and software ecosystem that schools need. And what's even more surprising is that South Africa has 18 dialects.

The only way to meet the needs of this rather complex education system is to act from within.

I don't think this segment can be handled the way foreign companies bring their products in and sell them.

I believe that in a region with such a large population, with such a large population and the infrastructure to support businesses, a local, integrated and comprehensive system is really important to the success of a business.

Here's a picture of a classroom that we've provided with computers in a school in my home country of Mexico.

This classroom is in a school in Michoacán.

If you're familiar with Mexico, you know that Michoacan is a very colorful state.

Children wear very colorful clothes, and the impact this has on them and on their computers is astounding. I have to say this: the impact that the accessibility of technology and connectivity has on these children's lives and their education is clearly worthwhile.

We recently set up a learning lab inside a school, at the Nelson Mandela School in the Western Cape province of South Africa, and it's pretty amazing to see the faces and the activities of these kids with access to computers.

And recently, they wrote me to let me know how excited I am about this impact, and the impact it's had on their lives, their educational dreams, their abilities, seems astonishing.

We currently have 30 engineers in 18 countries, connecting millions of people, trying to understand the needs and demands of this segment.

I also have to say that millions are not numbers, given the billions of people who need to be connected. This is just the beginning and we are learning a lot.

What I'm learning very well is what is necessary and effective for this segment.

One example is the "one laptop per person" plan.

you might know

It's a partnership between MIT and a group of companies, with Google and Red Hat involved, with AMD being a key player.

This "one laptop per person" device uses AMD technology, a microprocessor.

But let me tell you how creative this group is.

Because there are at least eight hours in a school day, and you want your child to be able to spend the entire day with a laptop, without charging the battery.

Our engineers have made some amazing improvements to this, and the battery in this product now lasts 15 hours, thanks to the innovative work that people have done, because of their passion and drive.

We're excited because it's expected to be available in schools by the end of this year.

This is a product specifically aimed at the education market, not only in the developing world, but also in the developed world, because it can have a big impact in making education more enjoyable and effective in some parts of America.

We've also partnered with TED, and we're planning a competition with Architecture for Humanity and TED Prize winner Cameron Sinclair to ask people in the construction industry to come up with the right designs for a computer lab in an emerging country.

We are very excited to be a part of this initiative and we are very excited to see the results of this really exciting activity.

Now, let me return to what I said at the beginning, and I'd like to conclude this presentation.

There are things that I think are really important in industry and business that I think are really important in industry and business, and I'm passionate about solving problems.

I don't think it's enough to put a problem on a spreadsheet and look at the numbers and say, "It's working."

I am deeply convinced that it is necessary to have passion.

And one of the things I've learned from my parents is that there's a little story about my father.

It took me a while to figure it out, but when I went to college, my dad said, "You're the first person in my family to go to college.

You must understand that for civilization to advance, each generation must live a better life than the one before it.

So this is your chance to live a better life than us."

To be honest, I don't know if I understood what my father was saying at the time.

I really wanted to go to college, so I looked for a girl, then I studied, studying was secondary, but I graduated from college, and then I fell in love.

I graduated and decided to get married.

On the day of our wedding, my father came and said again, "I'll say it again, each generation has to live a better life than the one before it.

You've got to be a better husband than I am, because that's what progress is." I'm finally starting to understand.

I knew my father was a very good husband, and that's why he started putting pressure on me again, just like I did when I was a kid. A few years later, I had my first child.

Now I realize that this was a dreadful challenge, my father gave it to me, because he was a great father.

But most importantly, my father nurtured my passion, so that I wake up every morning wanting to do better, and I know my role in life is not just the CEO of a Fortune 500 company.

My role is to make a small contribution to making the world a better place when we look back one day in the future. I believe that each of us can do this.

thank you very much

(applause)

Is there life in the solar system other than Earth?

What a bold question

As scientists -- as planetary scientists -- we didn't take this issue very seriously until recently.

Carl Sagan always said, "Surprising claims require surprising evidence."

Moreover, if you're going to claim that there's life outside of Earth, you've got to show clear grounds, make your claim out loud, and have a universal reason to make people believe.

So what kind of exploration should we do?

We decided to first look for the elements necessary for life.

The essential element of life is liquid water -- it has to act as a solvent, so it has to be liquid water, not ice.

also need energy

We also need organic matter, the building blocks of our bodies, and we also need to consume organic matter.

It is necessary for us to be confident that the long-term presence of these elements in the environment during the nascent stage of life is what allows life to arise, grow and evolve.

I'll confess, when I started my career, when I thought about these three factors, I believed that it was impossible for life beyond Earth to exist, even in small numbers, for a short period of time.

Why you ask? Speaking of inner planets

Venus is too hot to have water

Mars - dry and desolate

still no water

Outside of Mars, all the water in our solar system is frozen.

But the latest observations have overturned all of this.

To think more carefully, to find answers to life's mysteries, we're now turning our attention to the right place.

Where are the possibilities in the solar system?

We're looking carefully at four locations.

Mars and the three moons of the outer planets - Titan, Europa and the tiny Enceladus.

First, what about Mars?

Let's look for evidence

At first, we thought of Mars as a moon-like planet, a cratered, dry, dead world.

And about 15 years ago, we set out on a series of missions to Mars to see if there was ever water there that could change the landscape.

must detect changed terrain

In fact, we were immediately surprised.

High-resolution images showed deltas, river valleys and canyons that formed in the past.

In fact, the rover Curiosity, which has been exploring the surface for three years already, showed us that it is on the bed of an ancient river where water was flowing rapidly.

The water has been flowing for probably hundreds of millions of years, not for a short period of time.

If everything was there, including the organic matter, life would probably have started.

Curiosity dug into the red clay and extracted other matter.

We were so excited to see it

Because it wasn't red like Mars, it was gray material, gray Mars.

We took it back to the rover and inspected it. What do you think happened?

They detected organics -- carbon, hydrogen, oxygen, nitrogen, phosphorus, sulfur -- they were all there.

So Mars used to have a lot of water and probably had life for a long time, life was born and grew.

So is there still life?

i don't know that

But a few years ago, I started investigating a number of craters.

During the summer, a dark line appeared on the inner slope of the crater.

If you look more closely and look at more craters, you'll find more of this line.

Now found in dozens of places

An incredible story came true a few months ago.

The identity of these striations is liquid water.

we announced to the world

During the summer months, water gurgles in these craters.

Liquid water is pouring into the crater.

We know there's water, but what should we do next?

It shows that Mars has all the elements necessary for life.

At one time, two-thirds of the northern hemisphere would have been covered by ocean.

Even now, the water is flowing with a sound

liquid water is on the surface

organic matter is present

all conditions are in order

What next?

We launched a series of missions to search for life on Mars.

It's a mission as fascinating as ever.

If you go further out into the solar system, you'll find a small moon called Enceladus.

It's not located in the so-called habitable zone around the Sun.

far outside of that

In this object, there must be ice surrounding the silicate core.

But what have we discovered?

In 2006, the Cassini spacecraft approached, but when we looked back at the footage a few years after it passed by Enceladus, we were all amazed.

On Enceladus, it erupts like a stream of water into the space of the solar system, and then rushes back to the moon.

What a wonderful environment

A few months ago, Cassini passed through this water column and detected particles of silicate.

Where did silicon come from?

It must have come from the bottom of the sea.

Saturn pulls and compresses this moon, creating tidal energy that melts ice and creates oceans.

Energy is also produced internally.

If we can think of anything similar on Earth,

It's a hydrothermal vent

In 1977, a hydrothermal vent was discovered in the deep sea.

the oceanographer was stunned

Thousands of these things are now found on the ocean floor.

What did you find there?

Oceanographers have explored hydrothermal vents and found that they are teeming with life, whether the water is acidic or alkaline.

Hydrothermal vents are wonderful habitats for life here on Earth.

What about Enceladus?

We believe that hydrothermal vents, which have water now and are thought to have had water for a very long time, probably contain the necessary organic matter and are a possible place for life.

And it's not just microbes, there might be life that's much more complex, given the long time required for evolution.

Another satellite very similar to this one is Europa.

The Galileo spacecraft visited Jupiter's system in 1996 and made some spectacular observations of Europa.

Europa is known to have an ocean beneath its icy surface.

Galileo's exploration found that he never discovered a water column.

I didn't even try to look for it

When the Hubble Space Telescope was looking at Europa just a few years ago, it found water rising from a crack in the southern hemisphere and spraying it out, just like Enceladus.

These moons are not located in the so-called typical habitable zone of our solar system, but they do have liquid water.

And if there's more organic matter, there might be life.

These are great discoveries, because these moons have been in this environment for billions of years.

Life began here on Earth about 500 million years after the formation of stars, and it evolved into what it is today.

These satellites are wonderful stars

Let's take a look at another satellite, Titan.

Titan is a giant satellite of Saturn

It's much bigger than the planet Mercury.

This planet is covered with a thick atmosphere

It's mostly nitrogen, with small amounts of methane and ethane, but the atmosphere is so thick that you have to look underneath it with a radar.

Cassini found liquid on the surface.

can see the lake

Some are as big as the Black Sea

The liquid in this lake is not water, it's made of methane.

If there is a place in the solar system that, unlike life on Earth, harbors life that has a solvent other than water, such as methane, it might be Titan.

Is there life outside of Earth?

We don't know that yet, but we're eager to find out.

The data we receive is very exciting, and it leads us to new and exciting ways of thinking about the existence of life.

I believe exploration is headed in the right direction.

In the next ten years we will find the answer

The answer, if any, is that there is life, and that life is everywhere in our solar system.

think of it like that

we may not be alone

thank you

(applause)

we are depriving children of nature

This doesn't mean that the day will come when our children will think, "I wish we had protected nature." Unfortunately, that is possible.

We've defined nature so purely and rigorously for so long that by the time our children grow up, there won't be any nature left, according to the definitions we've created.

but this result can be changed

let me explain

Humans now spend half the world living, growing crops and timber, and grazing livestock.

If all humans were put together, it would weigh ten times as much as all wild mammals.

we cleared the forest and made a road

Because of us, the beach was littered with plastic particles.

We changed the chemical structure of the soil by adding chemical fertilizers.

And then we also changed the chemical structure of the air.

So your next breath will contain 42 percent more carbon dioxide than the air in 1750.

These and other changes are grouped together under the name of the Anthropocene, or Age of Man.

The term was proposed by a few geologists who thought it should be given to this world because of the great human impact on the Earth.

It's still a proposed name, but I think it makes sense given the power of human influence on the planet.

So how can nature be positioned?

What can we call 'nature' in a world where everything is human-influenced?

Twenty-five years ago, the environmental writer Bill McKibben said that nature is separate from humans, and that nature is doomed because climate change means humans have changed the entire planet.

In fact, the title of his book is "The End of Nature."

I disagree with this idea I disagree at all

I disagree with this definition of nature, because by nature we are animals.

That's right? In the course of our evolution on this earth, we have shared this planet with all animals, plants and microbes.

So I don't think that nature means something that hasn't been touched by humans.

In my view, nature is any place where life thrives, where there are multiple species, where there is vegetation and water, where there is life, where life thrives and grows.

Defining nature this way makes everything look a little different.

We know that there is certainly something in nature that appeals to us in particular.

Yellowstone National Park and Mongolian Steppe Great Barrier Reef Serengeti National Park

Places like this are supposed to be what nature looked like in the Garden of Eden, before humans messed everything up.

These places are less affected by everyday human activity.

For example, places like this usually have no roads or very few roads.

But in the end, even paradise like this is heavily influenced by humans.

So let's take North America as an example, because this is North America.

About 15,000 years ago, humans first arrived and interacted with nature, which resulted in mass extinctions of large animals. Great animals like mastodons, giant ground sloths, and saber-toothed tigers are all unfortunately extinct.

And when the animals went extinct, so did the ecosystem.

A massive chain reaction transformed the grasslands into forests, and the trees that made up the forests.

So even in a paradise like this -- a place that appears to be in pre-human perfection -- what we're looking at is actually a human-influenced landscape.

This is not just prehistoric people, but prehistoric people, and everyone from indigenous peoples to the first pioneers.

And this is the same on other continents

Humans have been interacting with nature with great influence for a very long time.

Just recently someone said to me, "There is still untouched nature."

I said, "Where are you? I want to go."

And the person said, "It's Amazon."

"Is it Amazon? I've been there before.

It's a wonderful place, isn't it?" I was sent by National Geographic to Manu National Park in the Peruvian Amazon. It's a vast, uncut, roadless, protected national park - one of the most biodiverse in the world.

When I went there in a canoe, what I saw was a human being.

people have lived there for hundreds and thousands of years

not just traversing the jungle, but living

It was building a close relationship with the surrounding environment.

they hunt and grow crops

growing plants

They use natural resources to build and roof their homes.

they also made wild animals pets

The people who live there are interacting with nature, which is very meaningful, and you can see traces of that interaction in the environment.

An anthropologist who was with me on this trip, as we were going down the river, said, "There's no place in the Amazon without people."

This phrase sticks with me because it means that the situation is similar across the Amazon.

there is no place without humans

Same with other rainforests, not just rainforests.

Humans have impacted ecosystems in the past, and they continue to do so today, even in less visible places.

If the definition of nature we're trying to use includes things like "untouched by humans" or "no humans," and that definition leads us to the conclusion that "there is no nature," then we probably have the wrong definition.

The definition of nature should be based on the existence of multiple species and the thriving life.

So what's the conclusion?

something like a miracle happens

Suddenly nature appears all around us

And all of a sudden, I see monarch butterfly larvae eating plants, and I realize there's nature, and it's in this vacant lot in Chattanooga.

look at this vacant lot

There are probably at least a dozen species of plants here that support insect life, and this is a completely unmanaged, completely wild place.

This is pristine nature that is close to us but unnoticed.

There's also an interesting little contradiction here.

This nature, this wild, untouched urban, peri-urban, and suburban flora that goes unnoticed, is arguably more pristine than national parks, because 21st-century national parks are so tightly controlled.

Crater Lake, in southern Oregon, is the closest national park to my home, and it's the epitome of a beautiful landscape that seems to have jumped out of time.

but it is strictly controlled

One of the problems is the threat of extinction of the white-spotted white-tailed guinea pig.

The American white pine is a beautiful and attractive pine.

It's the invasion of rash rust and the harm of bark beetles.

To combat this, the National Park Service is planting rust-resistant pine seedlings in parks and even in areas that are managed as wilderness.

They're also spraying bark beetle repellents in key areas, and I've seen it while hiking.

This kind of thing happens more often than you might expect.

National parks are strictly managed

Wildlife populations and composition remain constant.

wildfires extinguished

Noyaki is held

Invasive species are eradicated

Native species are reintroduced

In fact, if you look around, Banff National Park is doing the same thing: extinguishing wildfires, burning open fields, attaching transmitters to wolves, and releasing bison.

We do a lot of work to make it look pristine.

(Laughter) (Applause) And even more ironically, we love places like that, but sometimes we love them too much.

Many people want to go to places like this, so these places facing the Earth's changes are managed to be stable, but that can also make them increasingly fragile.

So places like this are the worst places to go on holiday with kids, because you can't do anything there.

can't climb trees

I can't even fish

No campfires in the middle of the wilderness

I can't even take pine cones home

Because there are a lot of rules and restrictions, and from a child's point of view, it's just the worst kind of nature.

Children don't want to spend five hours hiking and seeing beautiful scenery.

That's what adults want to do, while children want to squat down and tinker with things, play with things, build homes and outposts with things they find, things like that.

In addition, natural paradises like this are often far from people's living spaces,

It costs money to go, it's not easy to go

Only the rich can go — that's the real problem.

Conservancy group The Nature Conservancy surveyed young people about how often they spend time outdoors.

So only two out of five people spend at least one day outdoors each week.

The other three were staying indoors.

When we asked them why they didn't go outside and what was causing it, 61% of them answered, "Because there is no nature near my home."

This is a funny answer, completely wrong

Because 71 percent of people in America live within a 10-minute walk of a city park.

Probably no different in other countries

And that number doesn't even include backyards, city streams, or vacant lots.

We all live close to nature

All children live close to nature.

It's just that nature like that is no longer visible.

I've watched too many David Attenborough documentaries about how nature is so fascinating -- (Laughter) -- and I've forgotten how to see nature literally in front of my door, or in the trees that line the street.

Now let me give you an example, Philadelphia.

There's this nice elevated railroad there, but as you can see from the ground, it's abandoned.

A sky park in Manhattan, which is very similar to the one just before the High Line, but this one is still in the planning stage and has not been developed into a park.

So right now, it's like a secret wilderness, even though it's in the center of Philadelphia. If you can find a hole in the fence and you can climb onto the overpass, you can see a perfect wild meadow floating in the big city of Philadelphia.

All the plants growing here are naturally grown from seeds.

It's completely autonomous, self-generated nature.

Even though it's in the middle of the city

Several biological surveys have been carried out at this site, which have revealed more than 50 species of plants.

And it's not just plants

This is an ecosystem, a functioning ecosystem.

Soil is made, carbon is sequestered,

pollination is taking place

this is a real ecosystem

Scientists have decided to call these ecosystems "new ecosystems," because they are very strange environments dominated by alien species.

It's the first environment we see

For a long time, these new ecosystems were dismissed as worthless.

And I'm talking about weedy farmland, unmanaged mountain forests, regenerated forests in general, and all over the East Coast where forests arose after farmland moved westward.

Also, in Hawaii, most places usually have new ecosystems that are overwhelmingly dominated by invasive species.

This forest has Queensland maple and Southeast Asian tamashida.

You can also create new ecosystems of your own.

it's so easy

Just stop mowing the garden

(Laughter) Finnish ecologist Ilkka Hanski did an experiment.

He stopped mowing his garden, and a few years later, he called in some graduate students to study his garden's ecosystem, and they identified 375 plant species, including two endangered species.

This place, which will become Philadelphia's sky park of the future, is full of this wildness, diversity, abundance and vibrancy, but it's a place where you can look down and see the playground of your local school.

For the children here, there are many places that can be called nature by my definition, but this is probably one of the few places that can't be called nature.

Nothing except humans No other plants or animals

What I really want to do is put a ladder in this place and take the kids up to the cool meadow.

In a way, I think this is the choice we are faced with.

If we don't recognize this new nature and dismiss it as wasteful and unnecessary, we'll just cover it with concrete.

In a world where everything is constantly changing, we have to define nature carefully.

In order not to deprive children of nature, we have to do two things.

First of all, stop defining only pristine nature as nature.

because this doesn't make sense

Because no nature has been untouched for thousands of years.

The nature that people most visit and interact with is largely excluded from this definition, including nature that children cannot touch.

This brings us to the second thing we should do: let children touch nature, because you can't love what you don't touch.

(Applause) We are facing a very brutal environmental change on this planet.

Climate change is one of them.

And there's more. I'm interested in habitat loss, but thinking about it in the middle of the night horrifies me.

To solve these problems, we need people who are smart, enthusiastic, and interested in nature.

The only way to raise a generation that cares about nature is to expose it to nature.

I have a "base theory of ecology" — a "base theory of conservation"

All the ecologists and conservation biologists I know -- conservationists -- all built bases when they were kids.

A generation that doesn't know how to build a base will be a generation that doesn't know how to take care of nature.

Look at this kid, who participates in a special program that takes children from poor neighborhoods in Philadelphia to city parks.

I wish I had learned more from this boy. It doesn't matter where this plant came from, it's beautiful and worthy of being touched and loved.

thank you

(applause)

I read somewhere that I liked that one of the factors that contributed to our success as a species was the lack of body hair. That our hairlessness and nudity, combined with the invention of clothing, allowed us to regulate our body temperature at will, allowing us to survive in all climates.

Now we can't live without clothes,

Clothes are more than utilitarian, they're a kind of communication tool.

Everything we wear says something about where we are, what we do, and who we want to be.

i was a lonely child

I had a hard time making friends to play with, so I found a way to play alone.

I made a lot of my own toys

It all started with ice cream

In my hometown, there was 31 Ice Cream, and they served the ice out of huge 20-liter cardboard tubs lined up on the counter.

When I was eight years old, someone told me that there was an empty bucket washed and put in the back that you could ask for.

It took me two weeks to muster up the courage, but I asked for it and I got it.

I brought home that lovely cardboard tub.

I wondered what could be done with this fascinating material, with metal rings on the top and bottom.

When I put it on my head, I realized, "Oh, it's the perfect size for my head."

(Laughter) So I drilled a hole, put a transparent film on it, and made a space helmet.

(Laughter) So I need a place to put my space helmet on, so two blocks from my house, I found a big cardboard box.

I pushed it home, put it in the guest room closet, and turned it into a spaceship.

I started by making a control board out of cardboard.

I cut a hole for the radar screen and lit it with a flashlight from underneath.

On top, I put a screen facing a black wall. I thought it was a really clever idea, but without my parents' permission, I painted the walls of my closet black, made a starry sky out of some Christmas lamps I found in the attic, and embarked on a space mission.

About two years later, the movie "Jaws" came out.

I was too young to be seen, but like everyone else in America at the time, I had the Jaws fever.

You must have heard me tell someone that there was a store in town that had Jaws costumes, and it was really cool.

I know it's rude for older folks to complain that kids these days don't realize how lucky they are, but just take a look at what some of the entry-level kid's costumes you can buy online these days look like.

And this is the Jaws costume that my mother bought me.

(Laughter) It's got a floppy shark head and a vinyl print of Jaws posters on it.

(laughs) I loved it.

Then, about two years later, my father took me to a movie called "Excalibur."

They took me there twice, which was a big deal because it was an R-rated movie.

But it wasn't the blood, the guts, the boobs that made me want to see it again.

It's not without — (Laughter) it's armor.

The armor in "Excalibur" looked mesmerizing.

Knights clad in shining armor, literally polished like a mirror—

And the knights of "Excalibur" always wore armor.

Whether it's dinner time or bedtime

(Laughter) I wondered if you knew how I felt.

"I want to wear armor all the time!"

(Laughter) And then I got my hands on my favorite material again, cardboard, my kind of entry-level drug for building things.

Maybe I was exaggerating a little, here's the armor I made.

(Laughter) (Applause) This is the first armor I made inspired by Excalibur.

Two years later, I convinced my father to help me make a decent piece of armor.

It took me over a month to get out of cardboard and use roofing aluminum flashing, which is still my favorite fastener, pop rivets.

Over the course of a month, we painstakingly crafted a full suite of articulated aluminum armor with compound curves.

I drilled a hole in the helmet so it could breathe, and I finished it just before Halloween and wore it to school.

This is the only slide I can show you, because I don't have a picture of this armor.

I walked into school, and the yearbook photographers were roaming the hallways, but for reasons I'll explain later, they never saw me.

There was an unexpected problem with wearing full aluminum armor to school.

During math in the third period, I was standing in the back of the classroom because I couldn't sit in that armor.

(Laughter) This is one of the things I didn't expect.

In the middle of class, the teacher got worried and asked, "Are you okay?"

I thought, "What are you talking about? Are you okay?

You're wearing armor! The best time of my life..." I was about to say how good I felt when the classroom began to tilt to the left and disappeared down a long tunnel.

Because I was wearing armor, I got a heat stroke and passed out.

When I woke up, my thoughts weren't so embarrassed that I passed out in the classroom, but rather, "Where's my armor?"

Long after that, we ended up doing a show called "Mysterious Legends" on the Discovery Channel.

In the 14 years I've been doing this job, I've learned a lot about how to structure experiments and how to communicate them on television.

I also realized early on that costumes can play an important role in storytelling.

I use costumes to give humor, to give comedic character, and to clarify the story I'm telling.

And then, when I did an episode called "Trash Dive," I realized that costumes meant a lot more to me.

The question I'm trying to answer in this episode is, "Is it really as safe to jump into a trash can from a height as the movies make it seem?"

(Laughter) This episode was split into two parts.

One is to be trained by a stuntman to jump off a building onto an air mattress.

In the second part, we go to the experiment, where we stuff the trash can and jump into it.

I wanted to visually separate these two elements, so I thought, "The first part is training, so you should wear gym clothes. Yes, I'm going to write 'Stunt Apprentice' on the back of my clothes."

As you can see, it's training."

I wanted the second part to be visually impactful, so I said, "Okay, I'm going to go dressed as Neo from The Matrix!"

Buy nice knee-high boots with clasps

I also bought a long, slender coat on eBay.

I got sunglasses too, but then I have to wear contacts.

On the day of the filming of the experiment part, when I got out of the car wearing this costume, the program staff who saw it —

I could see that he was desperately trying to suppress his laughter.

"Woop" "Poo"

At this time, I felt two emotions at the same time.

One thing I'm embarrassed about is that it's obvious to the staff that I'm really into this costume.

(Laughter) But as a producer, I also knew that in high-speed slow motion playback, this coat would trail beautifully behind me.

(Laughter) In the fifth year of "Mysterious Legends," we were invited to Comic-Con in San Diego.

I've always wanted to go, but never had the chance to go.

It's a huge cosplay festival.

People come from all over the world to showcase their incredible creations on this stage in San Diego.

I also wanted to participate

I decided to cover myself up in an elaborate costume and walk around Comic-Con in secret.

the costume i chose

It's "Hellboy"

this is not me it's real

(Laughter) It took me months to put together the most visually accurate costume possible, from the boots to the belt to the trousers to that doomed right arm.

I found someone who made Hellboy's head and chest and decided to let me use them.

Prescription color contact lenses are also available

I wore this at Comic Con and I can't believe how fucking hot it was inside this costume.

(Laughter) I'm sweating. I forgot.

I was drenched in sweat and my eyes hurt from contact lenses, but it didn't bother me at all because I was completely absorbed in it.

(Laughter) Not just the process of putting on this costume and walking around the venue, but the community of cosplayers.

At Comic-Con, we don't call it "costume", we call it "cosplay".

Cosplay is about people dressing up as their favorite characters from movies, television and anime, but there's so much more here.

It's not like I found a costume and tried it on, I'm making it myself.

I change it to my liking

We're creating characters that we want to see on the show.

I have great creativity

It's full of geek power, and it's really cool.

(Laughter) Not only that, but I also practice a lot.

At Comic Con and other cosplay events, we don't just shoot people walking around.

I approach him and ask him, "I like your costume. Can I take a picture of you?"

Then wait for your opponent to strike a winning pose.

They go to great lengths to find the poses that make their costumes look their best.

I'm really impressed to see you

I also keep this in mind

For the convention that followed, I practiced how to walk Heath Ledger's Joker in The Dark Knight.

I practiced making the Ringwraith from "The Lord of the Rings" look so terrifying that it really scared the kids.

I practiced Chewbacca's "huh huh huh" laugh.

Then I dressed up as Kaonashi from "Spirited Away"

If there are people who don't know Hayao Miyazaki's "Spirited Away", I will forgive them.

(Laughter) It's an absolute classic, one of my favorite movies.

It's a story about a girl named Chihiro who gets lost in the spirit world at an abandoned theme park in Japan.

As Chihiro searches for a way back, she enlists the help of friends she made there.

Lonely Kaonashi wants friends and tries to attract attention by making money from his hands.

It doesn't go well and they go on a rampage, but they're saved by Chihiro, they're saved by Chihiro

I made up a Kaonashi costume and wore it at Comic Con.

And I practiced a lot of Kaonashi-like movements.

I was determined not to speak while wearing this costume.

If someone asks you to take their picture, nod and shyly stand next to them.

While I was taking pictures, I secretly took out a chocolate gold coin from inside my cloak.

I gave it to you when we parted

"A... a..."

everyone was overjoyed

"Kaonashi gave me money! Awesome!"

I was in a good mood walking around the venue, and it was really fun.

About 15 minutes later, something happened.

Someone grabbed my hand and gave me back the gold coin.

I thought you gave me some kind of coin in return, but no, I gave it to you.

I didn't understand why

while still taking pictures

it happened again

I can't see anything in this costume.

You can barely see your opponent's shoes through your mouth.

I can hear what the other person is saying, I can only see their feet

When the gold coins were returned to me for the third time, I wanted to know what it was.

So I turned my head up so I could see better, and I saw someone walking away and gesticulating like this.

That's when I came up with the idea that if you receive money from Kaonashi, you'll be unhappy.

Misfortune befalls everyone who receives money from Kaonashi in the movie "Spirited Away."

This is not the relationship between performer and audience, but "cosplay."

Everyone in the place put themselves in the story that is important to us

everyone makes it their own

We are all connected by the important things inside us

And costumes are how we present ourselves to others.

Thank you very much

(applause)

What would you do if you had to decipher, verify, and understand the information hidden in 11.5 million documents?

This was the challenge faced by a group of journalists at the end of last year.

An anonymous individual calling himself John Doe had somehow copied almost 40 years of records from the Panamanian law firm Mossack Fonseca.

Mossack Fonseca is one of many law firms around the world that specializes in opening accounts in offshore tax havens, such as the British Virgin Islands, for clients with money and power who want to keep their secrets.

John Doe painstakingly copied all of the firm's spreadsheets, client files and emails from 1977 to the present day.

This was the largest amount of insider information we've ever known about a tax avoidance system.

On the other hand, this was a tremendous challenge facing investigative journalism.

Think about it: 11.5 million documents hide the secrets of people in over 200 countries.

Where to start with such a huge amount of material?

Where should I start writing articles? Inspiration can reach all corners of the globe, and can affect almost any language group and any person, sometimes in unexpected ways.

John Doe provided information to two journalists at the Süddeutsche Zeitung.

In his own words, his motivation is "the scale of the fraud that this document will uncover."

But no single person can make sense of this much information.

So Süddeutsche Zeitung reached out to my organization, the International Union of Investigative Journalists in Washington, D.C.

As journalists, we decided to do the exact opposite of what we've been trained to do: share.

(Laughter) Investigative journalists are inherently lone wolves.

Sometimes we never reveal our secrets, even to the editorial department, because as soon as we reporters tell them what we've got, they demand an article.

And frankly, when I get good stuff, I'd rather take credit for myself.

What is certain, however, is that the world is getting smaller, and the media as a whole are slow to realize it.

The content we report crosses borders more and more

Big companies operate globally

Environmental and health issues are also global issues.

So are the money flows and the financial crisis.

So it's amazing that true global reporting is so late.

I'm also amazed at how long it's taken journalism to stop being afraid of technology and realizing its potential.

The reason journalists fear technology is that the media companies, the industry's largest organizations, are in trouble because of changes in the way we consume news.

The advertising revenue-based business model that has supported news coverage is collapsing.

This put journalism in jeopardy and forced media companies to rethink their role.

But with crisis comes opportunity.

The first challenge with the leaked information that was later dubbed the "Panama Papers" was to make the documents searchable and viewable.

There were nearly five million emails, two million PDF documents that needed to be scanned and indexed, and millions more files and documents of different formats.

Everything had to be stored in a highly secure location in the cloud

Then we invited journalists to look at this document.

In all, our reporters work for more than 100 media outlets in 76 countries, including the BBC in the UK, Le Monde in France, and the Asahi Shimbun in Japan.

The slogan is ``Local people with local eyes'' and the idea is ``Nigerian journalists are the best way to know important people in Nigeria''.

It was like, "If you go to Canada, Canadians are the best."

I told everyone I invited, there were only two rules: they had to agree to share everything they discovered with everyone — and they had to report it all on the same day.

News media partners were selected because of the trust they've built in previous small-scale collaborations and the relationships they've developed through the cues in this document.

Over the next few months, my small non-profit organization of less than 20 people was joined by more than 350 reporters from 25 language groups.

The biggest leak in history created the biggest press cooperation in history. 376 people got a local perspective and did what most reporters would never do: they worked shoulder to shoulder, they shared information, but they didn't divulge it to anyone.

At this point, it was clear to me that in order to make a tremendous amount of noise, a tremendous amount of silence is necessary.

We created a secure virtual editing room to manage a project that would take months.

It has an encrypted communication system and a custom search engine.

Inside the virtual editing room, the reporters could work together on what the document had revealed.

For example, reporters interested in conflict diamonds or works of art could share information about the cover-up through offshore financial centers about trading in those commodities.

Journalists with an interest in sports could share information about how famous athletes may have evaded taxes in the countries in which they operate by entrusting their image rights to offshore companies.

But perhaps the most exciting thing is the number of world leaders and elected politicians featured in the document: Ukrainian President Petro Poroshenko, Russian President Vladimir Putin's best friend, British Prime Minister Cameron, who was connected through his late father, Ian Cameron.

The documents also buried the names of secret offshore companies, one of which was Wintris, a company in the British Virgin Islands that was actually owned by the sitting Prime Minister of Iceland.

I'd like to introduce you to Johannes Christiansson, a journalist from Iceland who we invited to work on the project, "The Loneliest Man in the World."

For nine months, he refused a paid job and lived on his wife's income.

I put tarps on my windows to keep prying eyes out during the long Icelandic winters.

I quickly ran out of excuses for being absent, because I was working every night for months with red eyes.

Information that was withheld all that time led to the demotion of the leader of his country.

So let's say you're an investigative reporter and you make an amazing discovery, for example, if your country's prime minister is associated with a secret offshore company that has a financial stake in an Icelandic bank, and if that's the very bank's problem that got you elected prime minister, your instincts will make you want to howl.

But instead of barking, Johannes, one of the few people I could talk to, and I exchanged black humor.

He used to say, "Wintris is coming."

(Laughter) (Applause) We were both huge Game of Thrones fans.

Johannes and other reporters, when they felt like barking, barked only in the virtual editing room, turning their voices into stories by stepping away from the paperwork, going through court records and company registers, and interviewing the people they were trying to accuse.

Thanks to the Panama Papers, journalists are able to see the world differently than anyone else.

As we were doing our research, there was a massive political corruption scandal in Brazil that had nothing to do with us.

Argentina has elected a new leader

Meanwhile, the FBI has begun indicting executives of FIFA, the organization that oversees professional football around the world.

The Panama Papers gave us a unique perspective on these unfolding events.

It's easy to imagine the pressures and conflicts of egos that would have wrecked the goal.

It wouldn't have been strange for one of the journalists to have broken the agreement.

no one did that

And this year, on April 3rd, at 8:00 pm German time, we reported simultaneously in 76 countries.

(Applause) The Panama Papers quickly became one of the biggest news stories of the year.

This is the scene in Iceland the day after it was announced.

was the beginning of many protests

Iceland's prime minister forced to resign

It was the beginning of many resignations

We covered a lot of celebrities, like Lionel Messi, the most famous soccer player in the world.

It also caused unexpected results

These alleged members of the Mexican drug cartel were arrested after we released the details of their hideout.

They used the hideout address to register an offshore company.

(Laughter) There's an ironic side to what we've been doing.

Because journalism itself is being reborn thanks to the technology of the Internet that has destroyed the journalism business model.

This is the driving force behind unprecedented transparency and influence.

What we've shown is how a group of journalists can make an impact around the world by using new methods and old-fashioned reporting techniques to deal with vast amounts of leaked information.

John Doe provided the information, and we filled in the crucial gaps.

Sharing resources has allowed us to conduct in-depth investigations that are difficult for most news outlets these days due to economic concerns, detailed and lengthy investigations.

It's risky, and it doesn't work for every story, but we've shown through the Panama Papers that you can write stories for any country from almost anywhere in the world -- and you can choose your favorite battlefield to protect your job.

If you can get an injunction from the courts to stop articles in 76 countries, take it.

If you can stop the unavoidable flow, you should try to stop it

Shortly after I published the article, I got a message from Johannes, just one word: "Wintris is here."

(Laughter) If Wintris is here, so is the new era of journalism.

thank you

(Applause) Bruno Giussani: Thank you Gerrard.

I want to give this applause to the 350 journalists I worked with.

I have two questions

First, you've been working in secret for over a year with about 350 colleagues from all over the world, and have you ever wondered if a leak would come out or if someone would publish an article that would break the collaboration?

Or was there a threat that an outsider could sniff out the information and release it?

Gerard Lyle: There have been many crises in the process of reporting, for example, when there's a big event somewhere in the world, the journalists in that country want to go public.

I needed to calm down, and perhaps the biggest crisis was the week before the announcement.

We sent questions to Putin's friends, but they didn't answer, and instead the Kremlin held a press conference to blame us and the whole thing, like a "Western conspiracy."

At the time, Putin thought it was just his problem.

This was a major concern for editors around the world.

Because everyone thought the article would get leaked.

You can imagine how much time and people and money they've put into it.

So for the last week, I had to keep everyone calm, and I felt like a general trying to hold back his unit, saying, "First, calm down."

After that everyone calmed down.

Bruno: About two weeks ago, you put a ton of documents into an open database and made it available for anyone to search by keyword.

Gerard: It's our belief that basic information about offshore financial centers should be public.

We didn't release confidential documents about the journalists we worked with.

Basic information, like a person's name and what offshore company they own — the name of the company — is all available online.

It's one of the largest leaks on the internet right now. Bruno: Great job. Thank you.

Gerard: Thank you

(applause)

I want to talk to you about the future of money.

I'd like to start by telling you about the monetary culture of the early 1900s on the island of Yap in Micronesia.

The reason I'm talking about Yap is because the form of money is very interesting.

They used limestone discs called rye stones.

Yap people don't carry rye stones around or exchange money the way we do, because rye stones are very heavy.

The largest one is 4 tons and measures 3.6 meters.

So the Yapese are just keeping track of which part of the stone belongs to whom.

Yap sailors got into trouble when they tried to carry the stone across the sea and dropped it.

The sailors returned to the mainland and told everyone what had happened.

You know, you know, the sailors had the stones, and they recognized them as property.

The stone has sunk to the bottom of the sea, but it's still part of Yap's economy.

You might think that this was just a small culture 100 years ago.

But this kind of thing is happening in the western world, and the Yap people still use stone in this way.

In 1932, the Banque de France required the United States to convert its shares from dollars to gold.

But it was too inconvenient to actually ship all the gold to Europe.

So we sent people to where the gold was kept and simply labeled it "currently owned by France."

And everyone agreed that it was French gold.

Similar to Rye Stone

In these two examples, what I'm trying to convey is that a dollar, or a stone, or a piece of money has no inherent value in and of itself.

The only reason they're considered valuable is because people have decided they're worth it.

I decided so, so it's just that

Money is a way of exchanging and trading what we have with each other.

Money itself has no objective value.

It's a way for groups to communicate value to each other.

A fiction created by a group

And it's a very powerful concept.

In the last 20 years, digital money has come into use.

I pay by direct debit, I pay my rent by direct debit, I pay my taxes online.

Every month a small amount of money is deducted directly from my salary and put into a mutual fund to fund my retirement.

All these transactions are literally just rewriting 1's and 0's on the computer.

There are no physical entities like stones or coins.

Digital money enables instant payments to anyone in the world

This exchange is because the major banks guarantee payments according to the 1's and 0's that change on the computer.

When this doesn't work, it's often blamed on major banks like these.

At least the banks have to fix the problem.

the problem is frequent

system glitches often

How long did it take US credit card companies to introduce IC chips?

Half of my credit cards don't work in Europe

Here is an example of inconvenience

Sending money to other countries and in different currencies is very expensive and inconvenient.

Entrepreneurs in India can quickly set up an online business, but it's not easy to get a loan or get paid, which is inconvenient.

Free transactions using digital money are restricted by bank administrators.

Many restrictions in the system slow down the speed of trading

Because digital money is not at my disposal, and the databases I access belong to banks, credit card companies, investment banks.

And these companies have the right to say no.

Even if I use PayPal to conduct business, if PayPal misidentifies me as a fraudster, that's all.

my account is frozen and i can't get paid

THESE BANKS HAVE INNOVATION

A lot of people use Facebook or Google Photos or Instagram to do their photography, right?

My photos are stored in various places

A cell phone, a laptop, an old cell phone, Dropbox, etc.

Stored on various websites and services

These services are not integrated

cannot move back and forth

As a result, my photo library is disorganized.

Something similar happens when banks manage the money supply.

Many of these services don't interoperate, resulting in payment disruptions.

transaction costs rise

So far, we've used two types of money.

In the analog world, using physical objects, the speed at which money moved was exactly the speed at which humans moved.

In the digital world, money can travel farther and faster, but it's at the mercy of the bank gatekeepers.

Money is exchanged at bank speed.

Money is about to enter a new era

Future money can be programmed

By merging software and currency, money becomes more than just a static unit of value, it doesn't have to rely on banks for its security.

In a programmable world, transactions no longer involve human hands and banks.

If this is realized, it will not even feel like the hassle of making a transaction.

The movement of money is handled by software, and exchanged in a safe and reliable flow.

Cryptocurrency will be the first step in evolution

Cryptocurrency is digital money without government or bank intervention.

Designed to work in a world without middlemen

Bitcoin is the most widely used cryptocurrency, but there are hundreds of different types of cryptocurrencies.

Ethereum, Litecoin Stellar, Dogecoin are just a few of the popular cryptocurrencies

These can be used as real currency.

You can use bitcoins at the sushi restaurant on the corner that I pass by.

You can also buy sashimi with a mobile app.

But it's not just those small transactions.

100,000 bitcoins were traded this past March.

This is equivalent to about 4 billion yen

Cryptocurrencies are based on a branch of mathematics called cryptography.

Cryptography is a field of study that aims to ensure the security of communications, and it has two very important points: the ability to hide information so that it cannot be seen at first glance, and the ability to verify the source of the information.

Cryptography supports various systems in our daily life.

At one point, it was so important that the United States government used it as a weapon.

During World War II, defeating encryption systems such as "Enigma" was critical to deciphering enemy communications and even dominated the course of the war.

Now, with any modern web browser, you're using a very sophisticated encryption system.

It is used to ensure the safety of communications on the Internet.

Enter passwords and secure the transmission of financial information to websites

Banks have traditionally provided a reliable means of sending digital money, but now they can use cryptography in smart applications.

This means that we no longer need to rely on banks to make secure money transfers.

we can interact with ourselves

The way bitcoin works is very similar to the Yap concept of money, where the whole group knows how to send money.

In the Bitcoin world, sending Bitcoin is payment, and receiving Bitcoin is payment.

Imagine Magic Paper

Here's how it works -- I give you a piece of paper, and you write something on it, and that same thing magically appears on my piece of paper.

Suppose everyone is given a piece of paper like this, and someone fills in the details of the transfer on the bitcoin system,

It means that every transfer is copied on everyone's paper.

If you look at my paper, you can see all the transaction records for the entire bitcoin community.

This is how Bitcoin's blockchain, the decentralized network, describes all transfers.

It's just that there's a difference, instead of working it out on paper,

A computer program does this on millions of computers around the world that are connected to the Internet.

All these computers collectively verify the Bitcoin holder.

So the bitcoin blockchain is playing a pivotal role.

So where are Bitcoins minted?

Programs are written to create new bitcoins on a schedule.

One way to get this bitcoin is to solve random cryptographic puzzles.

Imagine you have 15 dice and you roll them over and over again.

When all the dice have a roll of 6, it is considered a "win"

These computers are doing something similar to this.

Try again and again until you get the right number

And if you hit it, you've solved the puzzle.

The program that solves the puzzle publishes the solution to other computers on the network and receives new bitcoins in return.

By solving this puzzle, the computer secures the Bitcoin blockchain and adds it to the transaction list.

There are people all over the world running this software, and this is called bitcoin mining.

anyone can mine bitcoin

You can download the software right now and try earning bitcoins on your own computer.

But I wouldn't recommend it, because today the puzzles are so hard, and we have such a powerful network, that if I were to mine on my laptop, I wouldn't get anything for two million years.

Professional miners use special hardware designed to solve puzzles very fast.

It's now estimated that the bitcoin network traffic and the energy consumed by these specialized hardware is equivalent to the consumption of one small country.

The first generation of cryptocurrencies was a little slow and a little bit more work.

The next generation is getting much easier to use and faster.

Cryptocurrencies are the first step towards a world of programmable money.

In a world of programmable money, you can make payments securely without signing, asking for permission, or converting, and without worrying about where you put your money.

and can send money all over the world

this is very nice

It's a concept of technological change that doesn't require permission.

The Internet has created an explosive technological revolution thanks to its open architecture.

Just as the Internet has changed the way we communicate, programmable money will change how we pay, how we distribute and determine value.

What kind of world will programmable money create?

Imagine paying a pharmaceutical company for data about healthcare.

They perform large-scale data analysis and use cryptography to demonstrate that data is only used for the agreed-upon purpose.

they pay for what they discover

What if, instead of logging into a streaming service and receiving a bill, my TV analyzed my tastes and suggested content that was reasonably priced that I could enjoy within my budget?

Imagine a page on the net without ads, where you simply pay when you view content without being forced to pay attention to ads.

Interestingly, micropayments like this are going to change the way we feel secure in the world, because once we can distribute value well, people will be able to put their money and energy into more constructive things.

Would spam still exist if people paid to send email, albeit less than a cent?

We're not in that world yet, but it will be soon.

Now it's like when cars first came into the world

The first cryptocurrencies were slow, hard to understand, hard to handle, like the first cars.

Digital money is as fast as horses and cars, and it works so well that economies around the world are built on it.

If you were to become the first owner of a car in your neighborhood with an internal combustion engine, you might get some strange looks from your neighbors, like, "Why would you want something that's stupid, noisy, breaks down all the time, sparks, and is slower than a horse?"

But we all know what happened to the car and the horse afterwards.

Programmable money has entered a new era

I'm very excited, but I'm also a little worried.

Cryptocurrencies may also be used for illicit transactions, just as modern cars can be used for crime.

When all transactions are online, what happens to surveillance? Who can monitor transactions?

Who benefits from this system and who does not?

Will I have to pay for something I didn't have to pay before?

Are we enslaved to evaluation by algorithms and utility functions?

With any new technology there are trade-offs.

The Internet has caused us to waste so much more time,

Productivity has improved a lot

Cell phones can be annoying because they make you feel like you're on standby all the time.

But you can always keep in touch with your friends and family.

The new sharing economy is stealing some jobs

On the one hand, it will create new flexible jobs.

Programmable money decouples the need for a major creditworthy bank from the mechanics of the network

This brings monetary reform to the forefront.

Programmable money democratizes money

Because of that, things change and unfold in ways you can't even imagine.

thank you

(applause)

The most complex problems of our time can be solved with simple techniques, if you can dream -

As a child, I discovered that creativity was the key to making dreams come true.

I learned this from my grandmother, Dr. Ruth Tihauer, a Jewish refugee who settled in the Andes Mountains.

That's how I grew up, being told to look beyond any limits—

My education, including helping her, took place in a remote, poor community.

I cherish that memory because it helped me understand life away from the city, a life with so many possibilities, without barriers like language and culture.

During those trips, my grandmother would read Kipling's poem aloud, "There's something hidden, go and find it.

go deep into the mountains

something lost deep inside

Something lost and waiting for you Go! ”

A few years later, I became a medical student.

One in 100 babies are born with some form of heart disease.

There's a part of this problem that I think can be solved, and it's something I've been working on all my life.

problems start during pregnancy

A fetus must survive in its mother's womb.

To survive, we need communication between the systemic and pulmonary circulations.

At the moment of birth, this contact must cease

If this didn't close, it would leave a hole in the baby's heart.

It can be caused by premature birth or genetic factors.

But today, we know that lack of oxygen is also a factor.

As you can see from the table, the frequency of these types of holes increases dramatically with land elevation.

Video (Baby Crying) If you look at a patient with this pathological condition, it looks like they're trying to breathe.

Major surgery was the only solution to close the hole.

One night my friend Marte was camping in the Amazon region.

The only thing that didn't burn was the avocado sprig.

I had a flash there

As a first attempt, I decided to use the twig as a template.

It can close the hole in a child's heart.

A coil is a single coil of wire.

It may not look particularly cool at this point, but it was our first successful attempt at creating a device that would solve a serious problem.

In this video, you can see how a very small catheter can deliver a coil to the heart.

The coil does that and closes the hole.

After that moment of inspiration, I spent a very long time trying to build a prototype.

Thousands of hours of in vivo and in vitro research were done in the lab.

If the coil works, it can save lives.

I came back from Germany to Bolivia, thinking I could change medicine anywhere.

Together with my wife and partner, Dr. Alexandra Heath, I started seeing patients.

After successfully treating a patient with our coil, we were really excited.

But we live at an altitude of 3,600 meters.

And these patients need special equipment to treat their heart problems.

At different elevations, patients have different holes because the holes between the arteries are larger.

Most patients die without treatment in time.

The first coil was able to successfully treat only half of the patients in Bolivia.

research started again

we rearranged

After many trials, I got a new device with the help of my grandmother's local friend in the mountains.

For centuries, indigenous women told stories by weaving intricate weaving patterns.

Incorporating this traditional weaving technique, we create shapes with smart materials that have shape memory Create shapes with smart materials that have shape memory

This time, it looks like we can mimic weaving and make something seamless and rust-free.

It can transform itself into very complex structures using procedures developed over decades.

As you can see, this device enters the human body through blood vessels.

The doctor just needs to close the catheter through the hole.

The device expands on its own, locks in place and closes the hole.

We've got this wonderful system that works on its own and is very easy to use.

didn't need open heart surgery

(Applause) As doctors, we fight diseases that, if they can be cured, take a long time and effort.

This is what the child looked like after the procedure.

As you can see -- (Applause) As you can see, once the device is inserted, the patient is 100 percent healed.

The entire procedure from start to finish takes only 30 minutes

It's very rewarding from a medical and human standpoint.

We're very proud to have some former patients who are now part of our care team, a team that's combined with our close interactions with our patients.

And that's where a shared notion comes into being: "The best solutions should be simple."

The fear of creating something new has disappeared

the road is not smooth

Many obstacles always occur

But we get our strength from our patients.

The strength and courage to overcome a patient's predicament fuels our creativity.

Our goal is to ensure that no child is left alone because of cost, access, or whatever.

So we have to start a one-to-one fund.

We give away one piece of equipment for free to make sure every child gets treatment.

We are already doing it in many countries, but we have to reach every country.

All of this started with one impossible idea and continues - without really leaving a single child behind.

thank you

(applause)

When I decided to create an art piece in Manshet Nasser, the garbage collectors of Cairo, Egypt, I had no idea that this project would be the best experience of my life.

I had a humanitarian intent: "I want to bring art and hopefully bright light to poor and neglected neighborhoods to beautify this isolated neighborhood."

I first learned about this region, which is home to the Coptic Christian sect, in 2009, when Egyptian authorities under Mubarak decided to cull 300,000 pigs on the pretext of the H1N1 virus.

Originally, the people who live here are pig producers.

They collect organic waste every day and feed it to pigs and other livestock.

culling destroyed their lives

When I first set foot here, I thought it was like a maze.

I was looking for St. Simon's Monastery on Mokattam Peak.

Go right, go straight, right again, then left until you reach the top.

But to get there, you have to weave between trucks full of garbage, and between tuk-tuks, the fastest form of transportation around here.

The smell of garbage being unloaded from a truck is strong, and it's overwhelmed by the terrible street noise.

In addition, the sound of the garbage crusher echoes from inside the warehouse.

Seemingly chaotic, but everything is orderly

Here, we call ourselves "zalaiev," or pig farmers, and for decades we've been collecting garbage from all over Cairo and sorting it right here in our neighborhood.

They've created one of the most efficient and profitable systems in the world.

Yet the reason people think of this place as dirty, marginalized and discriminated against is because they associate it with trash.

The first idea was to create an "anamorphose" kind of work, a work that can only be seen from a certain point of view.

I wanted to create a painting that spanned multiple buildings, so that I could see the whole picture from just one point on Mount Mokattam, and I wanted to do an artistic challenge.

Mount Mokattam is the pride of the region

They dug a mountain here and built a 10,000-seat cave church, St. Simon's Monastery.

When I first stood on the top of the mountain and looked around, I asked myself, how am I going to convince all the building owners to let me paint on the walls?

Then Magdo appeared

Magdo is a church guide

He told me that there was only one person he needed to convince: the community leader, Father Samman.

But to convince the priest, I had to convince Mario, an artist from Poland who moved to Cairo 20 years ago and did all the decorations for this cave church.

Thank you Mario for being the cornerstone of the project.

I arranged for him to meet Father Samman, and he liked the idea.

He asked me about the places I'd been painting and how I was going to make it happen.

What I was most worried about was what I would write.

Each piece writes a message in its own Arabic calligraphy.

What I'm trying to do is paint a message that's relevant to the place, but also has a universal dimension that people around the world can understand.

So Manchette Nasser decided to write in Arabic the words of Saint Athanasius of Alexandria, a third-century Coptic bishop, and he said, (Arabic), in English, "If you want to see the sunlight clearly, first cleanse your eyes."

What was important to me was that the community felt a connection with this word.

For me too, those words summed up the spirit of the project.

The priest blessed and approved the project, and the whole population got involved.

Hundreds of liters of paint, 12 blue manual lifts, a few round trips to Cairo, and a strong, dependable team from France, North Africa, the Middle East, America, and a year of planning and sourcing to get us here. My team and people from the community set out to create 50 wall paintings.

Blue here, yellow there, orange there.

Some people brought some sandbags and put them on the roof of the building and fixed the manual lifts.

In the early days of the project, I was numbering all the buildings in my sketches because there was no real interaction with the community.

People didn't understand the purpose of the project.

But soon the building numbers were replaced by names.

The first building is Uncle Ibrahim's house.

Uncle is a very passionate person

They were singing and joking all the time. My uncle's daughter and son saved me from a cow. They tried to attack me on the fourth floor.

(Laughter) The cow saw me through the window and came out onto the balcony.

(Laughter) That's right.

Uncle Ibrahim was always on the balcony and talked to me while I was painting.

My uncle said, "I haven't climbed a mountain in ten years, and I haven't had a day off --

Even if you take a break from work, the trash won't rest."

But to my surprise, when the project was finished, my uncle came all the way up the mountain to see the work.

He was really happy with his paintings in his house, and he said, "This project is about peace. I'm sorry. (Applause) Thank you."

My uncle said, "This is a peace and unity project that will bring people together."

My uncle's view of this project has changed, and so has my view of the area and the work of its inhabitants.

None of the trash that people hate is from them.

they are only using

I'm not living in garbage, I'm using it.

So I started questioning myself and wondering what the real purpose of this project was.

It wasn't about beautifying the area with art.

The real purpose was to shift perspective and start a conversation about the connections that can be made in places you don't know.

It was always a pleasure to go to the mountains to see this work, as the calligraphic circles unfolded day by day.

And standing in the same place every day, I could understand the symbolism behind this anamorphic work.

If you want to see people for who they really are, maybe you should change your perspective.

There were difficulties and doubts such as fear and stress

It's not easy to work in this kind of environment, and sometimes when I'm painting, there's a pig below me, and other times I'm climbing a pile of trash to get on the lift.

But we all got through the fear of heights, the swinging lifts, the strong smell, the stress of not finishing on time.

The kindness of the local people made me forget everything

Building number three was the house of Uncle Bahit and Aunt Farida.

In Egypt, we have an expression, "Ahsen Nas," which means "best people."

these two were just awesome

When I was resting in front of my uncle's house, all the neighborhood children gathered.

The children of Manshet Nasser impressed me.

For the first few days, even if I try to give them, they won't even touch sweets or juice.

When I asked Aunt Farida why

He told me, "I've been trained not to take anything from strangers because they may need it more than I do."

It was at this very moment that I realized that the Zaraib community was the ideal place to raise the issue of perspective.

What we need to do is look only at the differences between ourselves and various regions and question the misunderstandings and judgments that society has.

I remember being late at work at Uncle Ibrahim's house when a pig on the roof gnawed at the sandbags that held the lift in place.

(Laughter) Uncle Bahit and Aunt Farida's house turned into a meetinghouse.

everyone gathered there

And I think that's what Uncle Ibrahim meant when he said, "The Project for Peace and Unity," because it really felt like we were all coming together.

Everyone greeted me with a smile, offered me a drink, invited me into their house at noon.

When I was on the first floor of the building, he would open the window and serve me tea.

If you go to the second floor, there will be someone who will serve you again.

It's been like that all the way up to the top floor

(Laughter) (Applause) In Egypt, I drank the most tea I've ever had.

(Laughter) To be honest, I could have done it sooner, but I think it took me three weeks because of tea time.

(Laughter) In Egypt, we also have an expression, "Nawartouna" -- "You brought us light."

That's what people always said at Manchette Nasser.

For this calligraphy, I actually used white luminous paint, and at the end of the project, I borrowed a black light floodlight to illuminate the area and surprise everyone.

I wanted to tell them that it was they who brought the light.

(Applause) The Zaraib community is strong, honest, hardworking, and they know their worth.

The people of Cairo call them "Zabbaleen" — the "garbage people," but ironically, the people of Manshet Nasser call the people of Cairo Zabbaleen.

Because, they say, it's Cairo who takes out the garbage.

(Laughter) (Applause) Our goal was to leave something for the region, and I think they are the ones who have left something for us in the way we live our lives.

This project was just the beginning of a very human experience.

Artwork will disappear one day.In fact, in front of Uncle Ibrahim's house, there are people building the second floor, and they're going to hide some of the work, so I'm going to have to go back and paint there.

(Laughter) This project was about experiences and stories and moments.

From the streets around here, each piece looks like a separate, independent piece.

But what was associated with calligraphy was a powerful message that everyone should think before judging anyone.

If you want to catch the sunlight properly, you should clean your eyes first.

thank you

(applause)

hello everyone

I brought a baby diaper

now you know why

Disposable diapers use an interesting material.

Millions of babies are demonstrating every day that disposable diapers can swell up so much when they absorb water.

(Laughter) And the reason is that diapers were cleverly devised.

Because it's made from a swellable material.

The special material swells up to a thousand times its volume when water is added.

Although this is a useful industrial polymer,

My group at MIT is working to see if we can do something similar for our brains.

The idea is to make the brain bigger, so big that you can look inside the brain, and see how all the biomolecules in the detailed components are organized in three dimensions, and see what the brain actually looks like.

If we could do that, we would have a better understanding of how our brains generate thoughts, emotions, actions and sensations.

We may be able to pinpoint exactly which part of the brain changes cause various diseases: Alzheimer's disease, epilepsy, Parkinson's disease.

Our research group at MIT is trying to take a different perspective and a different approach than the last 100 years of neuroscience.

We are both designers and inventors.

What we're working on is creating a technology that looks inside the brain and repairs it.

The reason we need such technology is that our brains are extremely complex.

Over the course of the 20th century, what we've learned in neuroscience is that the brain is a very complex network of specialized cells, neurons, in a very intricate arrangement, and electricity flows through these intricately organized neurons.

And the neurons that make up the network

They connect with each other through tiny connections called synapses, communicate with each other through chemical substances, and exchange information with each other.

our brains are very dense

It means that there can be about 100,000 neurons, a billion synapses, within one cubic meter of the brain.

not only that

If you zoom in on a single neuron, of course, this is just a conceptual drawing --

We see thousands of biomolecules, tiny nanoscale biomolecules organized into complex 3D forms that pulse together, exchange chemicals, make neurons work together, produce thoughts, emotions, and more.

We don't know how neurons network in the brain. We don't know how these biomolecules are organized within neurons to have these complex, organized functions.

If you really want to understand this, you're going to need new technology.

If we could have a map like that, and see how molecules and neurons and neurons and networks are organized, perhaps we could really understand how our brains process information from our perceptual cortex, mix it with our emotions and sensations, and move us into decisions and actions.

We may be able to find out exactly which molecular groups cause brain diseases.

Once we know how the molecule has changed, whether the problem molecule multiplies or the pattern changes, we could use that information to target new drugs and use it for new ways of pumping energy into the brain to restore brain function in patients with brain disease.

We've been trying to tackle this problem with a wide variety of technologies from the last century.

I'm sure you're familiar with MRI, which takes pictures of the brain.

It's non-invasive, it's powerful, and it can be used in living humans.

low spatial resolution

Each pixel, called a voxel, contains millions of neurons.

So at this level of resolution, we can't pinpoint changes at the molecular level, changes in the wiring of neural networks that are responsible for the enhanced ability to control human consciousness.

On the other hand, you also have a microscope.

Of course, microscopes use light to see tiny things.

It's been used for centuries to see things like bacteria.

In neuroscience, neurons were first discovered using a microscope, about 130 years ago.

But what you can see with a microscope is basically limited.

You can't tell the molecules apart under a normal microscope.

can't see small joints

If we want to be able to see the brain in greater detail, and if we want to understand the underlying structure of the brain, we're going to need more advanced technology.

A few years ago, my research group started thinking, "Let's go backwards.

If it's so hard to zoom in on the brain, why not make it bigger? ”

I started with two graduate students, Faye Cheng and Paul Tilberg.

Many of my group are now participating in this process.

I decided to see if the polymers used in disposable diapers could be used by actually implanting them in the brain.

Once it's in place and you've added water, you can inflate the brain, and you can discern each and every tiny biomolecule.

By looking at how they connect, we can map the brain.

this can be quite dramatic

I brought that little demo

Here are the refined materials for disposable diapers

It's better to buy it online than to extract the tiny amount of polymer that's actually in the diaper.

Here is a teaspoon of purified polymer.

there is water here

Now we'll see if a spoonful of diaper material polymer grows.

Now you can see that it swells about a thousand times

I could add more water, but I think you can see that polymers are very interesting molecules, and if used correctly, you might really be able to zoom into your brain in a way that no technology has ever done before.

A little chemistry this time

What's going on with the polymers in disposable diapers?

If you zoom in, it looks like a slide

A polymer is an elongated chain of atoms

The chains are very thin, about the thickness of a biomolecule, very dense.

The distance between chains is about the size of a biomolecule.

And the reason this is so good is that it might allow you to isolate everything in your brain.

When water is added, this swellable material absorbs water, increasing the distance between polymer chains and causing the entire material to swell.

The polymer chains are very thin, and the spacing between them is the size of a biomolecule, so the more you can see, the more you can inflate the brain.

But the question is, how can we create these chains of polymers in the brain to separate the brain's biomolecules?

If we can do that, we can create a brain map,

you can see neural circuits

So you can look inside and see the molecules.

To illustrate this, I created an animation, and this conceptual diagram shows what biomolecules look like and how they separate.

Step 1: The first thing we have to do is put a little handle on all the biomolecules shown in brown.

Because we have to separate the brain molecules one by one, we need a little handle to do that.

If you just put a polymer from a disposable diaper on top of your brain, it's just sitting on the surface of your brain.

We need to figure out how to get the polymer into the brain.

this is where i'm so lucky

We can use a monomer, called a monomer, for this, and we can put it in the brain and cause a chemical reaction to create this long chain of polymers, on the fly, in the brain tissue.

Polymers wrap around and between biomolecules, creating complex webs that eventually pull the molecules away from each other, and eventually pull the molecules away from each other.

If you have one of the handles, the polymer binds to the handle, and that's exactly what you need, and it pulls the molecules away from each other.

Actually, one important thing here

You have to treat the sample with chemicals to break up the molecular ties, and then when you add water, the swellable material starts to absorb water.

It's like painting on a balloon. If you blow up the balloon, the image above is the same, but the ink molecules in the painting move away, one by one.

And the same thing could be done in 3D.

There is one last trick

As you can see here, all the biomolecules are colored brown.

because they are all similar

Biomolecules are made up of the same atoms, just arranged differently.

So the last one is what you need to identify the molecule.

It's a little name tag that uses a glowing dye to help identify biomolecules.

Some biomolecules are in blue

another kind is red

Change colors by type

that's the last step

Now we can look at the brain molecules one by one, because the molecules are far enough apart that we can distinguish individual molecules.

The goal here is to make visible what was previously invisible.

By inflating the small, obscure things, we can see the aggregates of information held by living things like constellations.

Here's an actual video of what it looks like

There's a small brain in the culture dish... there's a little part of the brain.

Polymer is infused Add water to this

What's happening right before your eyes is... this video has been compressed 60 times, and this tiny piece of brain tissue is getting bigger.

can be a hundred times larger or even larger

The beauty of this is that the polymer is so small that it separates the biomolecules evenly.

Smooth inflation

The arrangement of information is not lost

just to make it easier to see

Now you can see the actual neural circuits of the brain. For example, here is the part of the brain responsible for memory. Zoom in here.

You can see how the neural circuits are wired.

Maybe in the future we'll be able to read memories

Maybe we'll be able to see how neural circuits work to generate emotions, how those neural circuits are wired together to make us who we are.

Of course, if things go well, we'll be able to pinpoint the actual problem areas in the brain at the molecular level.

It would be amazing if we could actually look at the cells in the brain and say, "These 17 molecules are causing changes in brain tissue that are causing epilepsy," or seeing the transition in Parkinson's disease, or being able to fix it.

If you can get a systematic list of bad spots, that's the target for treatment.

A drug is made that binds to it

By focusing energy on specific parts of the brain, we could help over a billion people around the world with Parkinson's disease, epilepsy, and other brain disorders.

something interesting is happening now

There are other problems in medicine where being able to see biomolecules under magnification helps.

This is a biopsy from a breast cancer patient.

So when you look at things like cancer, the immune system, and aging and growth, all of these involve whole biological systems.

Of course, those problems start with the nanoscale molecules that make up the cells and organs that make the human body function.

So now we're trying to use this technology to map the building blocks of life, to see if it can be used broadly for a wide variety of diseases.

Can't we pinpoint the molecular changes that occur in cancer, capture them in a clever way, and deliver the drug to the exact spot to eliminate just the cells we want to eliminate?

As you know, many drugs are dangerous.

sometimes dosed by guesswork

My hope is to make the risky and reckless treatment of going to the moon more reliable.

Most real-life trips to the moon were grounded in solid science, because they landed on the moon.

Based on our understanding of gravity and aerodynamics

the spaceship was made

scientifically controlled risk

It was a collection of great technologies

I don't think there's always such a rule in medicine.

Are there any laws in medicine like gravity or aerodynamics?

We might be able to derive those laws using technology like the one I'm talking about today.

We can map the patterns that occur within our biological systems and find ways to overcome the diseases that plague us.

My wife and I have two young children, and as a bioengineer, I want a better future for them.

And if we can move biology and medicine from a risky endeavor that relies solely on chance and luck to something that is possible with daily diligence and honing our skills, that would be a huge step forward.

thank you

(applause)

Sitting around a campfire, you can feel the heat, smell the smoke and crackle from the trees.

If you get too close to the fire, your eyes will burn and your nostrils will burn.

Twisting, flickering, endlessly transforming bright flames, you can watch forever.

What exactly are you looking at?

Fire is clearly neither solid nor liquid.

Mixed with the air, the flame looks more like a gas, but more distinct and fleeting.

Scientifically speaking, fire is different from gas because gas can exist in the same state forever, but fire eventually burns out.

One misconception is that fire is plasma, and plasma is the fourth state of matter when atoms lose electrons.

Plasma, unlike other substances, like fire, does not exist in a stable state on Earth.

Plasmas form only when a gas is subjected to an electric field or heated thousands or tens of thousands of degrees.

Fuels like wood and paper, on the other hand, burn at hundreds of degrees below the threshold for plasma formation.

If fire isn't a solid, a liquid, a gas, and a plasma, what's left?

Fire is not a substance

It's a sensory experience when we see a chemical reaction called combustion.

In some ways, fire is like autumn leaves, ripe and fragrant fruit, or the flashing lights of fireflies.

All of these are our perceptions of chemical reactions taking place.

What makes fire different from these is that it responds to so many senses at the same time that we have a vivid experience that we feel from a physical object.

Combustion creates these experiences using fuel, heat, and oxygen.

In a campfire, the wood is heated to an ignition point, breaking down the cell walls and releasing sugars and other molecules into the air.

When these molecules react with the oxygen in the air, they produce carbon dioxide and water.

At the same time, the moisture trapped inside the wood evaporates, expands, tears the surrounding wood, and escapes with a crackling sound of satisfaction.

As the fire heats up, the carbon dioxide and water vapor produced by the combustion expands.

It becomes less dense and rises like a thin column.

Gravity causes this expansion and rise, giving the flame its characteristic tapered shape.

Without gravity, the different densities wouldn't separate the molecules, and the flame would have a completely different shape.

We can see fire because combustion also produces light.

Molecules emit light when heated, and the color of the light depends on the temperature of the molecule.

The hottest flames are white or blue

The type of molecules in the solid fuel also affects the color of the flame.

For example, the carbon atoms in the wood left unburned will become small clumps of soot that become flames, giving off the bright orange glow that we associate with a campfire.

Substances such as copper, calcium chloride, and potassium chloride add a unique color to the flame.

Besides the colorful flame, fire always produces heat when it burns.

This heat keeps the fuel above its ignition point, sustaining the flame.

Eventually, even the hottest flame will run out of fuel or oxygen.

The twisting flame finally flashes and vanishes with a puff of smoke, as if it had never been there in the first place.

Imagine walking in the woods

You probably think of a cluster of trees, which we forest keepers call a "stand," consisting of the rough trunks of the trees and the beautiful canopy.

Trees are certainly the foundation of forests, but forests are not what you see, and today I want to change the way you think about forests.

There's another world underground, a biological world with endless pathways that connect the trees and make them interact, making the forest almost like a living organism.

it even reminds me of intelligent animals

how did you know this

I will tell you the story

I grew up in the woods of British Columbia.

I used to lie on my back in the woods, looking up at the canopy.

it was a spectacular view

my grandfather was also a big man

He was a lumberjack who selectively felled cedar trees in the inland rainforest and hauled them out on horseback.

My grandfather taught me how the forests are intricately linked together and how my family is woven into them.

And I'm following in my grandfather's footsteps

My grandfather and I both had a curiosity about the forest, and the first thing that opened my eyes to the forest was an incident in an outdoor toilet by a lake.

That's when the family's dog, Jiggs, slipped into that hole.

Grandfather ran out with a shovel and tried to rescue Ziggs.

Poor Jiggs was swimming in the manure.

When my grandfather dug the ground, I was very intrigued by the roots that appeared there, and underneath that was the white mycelium that I would later come to know, and then underneath that were layers of red and yellow minerals.

Eventually, my grandfather and I rescued Ziggs, and that's when I realized that the roots of trees and the layers of soil together are the real foundation of the forest.

i would like to know more

I studied forestry.

Before I knew it, I was working for an influential person controlling commercial logging.

Clear-cutting the forest was already at the alert level.

Not only that, but the aspens and birches were removed by pruning and chemicals, and I was surprised to see the more commercially valuable pine and fir trees planted in their place.

Nothing seemed to stop the wheels of this relentless industrial machine.

So I went back to college and started researching the hidden areas of the forest.

Around that time, lab experiments had just shown that pine radicles could transfer carbon to each other.

This is in the lab, but does it happen in the forest as well?

I'm sure

I also thought that the trees might be exchanging information underground.

But those theories were so problematic, some people thought they were stupid, and research funding was slow.

But I didn't give up, and I went deep into the woods to do some experiments, and that was 25 years ago.

We raised 80 seedlings from 3 species of trees: American birch, Douglas fir, and western cedar.

Birch and fir are connected by an underground network, but cedar is not.

I expected to be in a world of my own

So I scraped together my equipment and I didn't have the money, so to be thrifty.

I went to Canadian Tire (Laughter) and bought a plastic bag, duct tape, a blind cloth, a timer, a disposable jacket, and a gas mask.

Then we borrowed high-tech equipment from the university—Geiger counters, scintillation detectors, mass spectrometers, microscopes.

And we've got a very dangerous thing: a syringe full of carbon-14, a radioactive isotope of carbon dioxide, and a high-pressure cylinder, and the cylinder is filled with carbon-13, a stable isotope of carbon dioxide.

I did get permission.

(Laughter) But I forgot something very important: bug spray, bear spray, gas mask filters.

Ah

On the first day of the experiment, when I went to the place I was supposed to be, I was chased away by a group of grizzly bears.

Because I didn't have bear spray.

Research in the Canadian forests is destined to:

(Laughter) When I returned the next day, the mother and cubs were gone.

Now it's time to start researching properly. Put on your disposable paper jacket, put on your gas mask, and then put a plastic bag over the seedling.

I took out a giant syringe, put a plastic bag into it, and injected carbon dioxide, a carbon isotope tracer, into the birch tree first.

A radioactive gas, carbon-14, was injected into a bag over a birch seedling.

Next, we injected the carbon isotope carbon-13 carbon dioxide into the fir tree.

I used two isotopes because I wanted to see if these three species of trees were interacting with each other.

I was about to start the 80th and final bag when suddenly the grizzly mother appeared again.

They followed me, I lifted the syringe over my head, chased away the mosquitoes, jumped in the truck, and thought, "So we're all doing research in the lab."

(laughs) I waited for an hour.

Given this amount of time, they speculated, the trees would be producing carbon dioxide through photosynthesis, turning it into sugar, sending it to their roots, and possibly sending the carbon underground to nearby trees.

After an hour, I opened the truck window to see if there was a mother bear...

it was good! I was eating huckleberries on the other side.

So I got out of the truck and got back to work.

Remove the first birch bag

If you put a Geiger counter on a birch leaf,

Whoooo!

well done

The birch trees were breathing in radioactive gases.

Judgment time has come

Go to the fir sapling

take the bag

When I brought my Geiger counter close to the leaves of a fir tree, I heard a beautiful sound.

Whoooo!

The birch says to the fir tree, "Can I help you?"

The fir tree answers, "Could you give me some carbon?

Someone put a cloth over me to keep me in the shade."

I approached the cedar and held the Geiger counter over the leaf, and as expected, there was no response.

Sugi lives in her own world

It's not connected to the network of conversation between the birch and the fir tree.

I was so excited that I went around looking at all 80 planted seedlings, one after the other.

This result clearly

Carbon-13 and carbon-14 proved to be active exchanges between birch and Douglas fir.

In the summer of the year that we did this experiment, the birch trees were giving more carbon to the fir trees than they were getting from the fir trees, especially when the fir trees were in shade.

Then later experiments showed that the opposite was also true: the fir trees were giving the birch more carbon than they were getting from the birch, when the fir tree was still growing alongside the birch that had lost its leaves.

In this way, the two species of trees were validated as being interdependent, like yin and yang.

At that point everything became clear

I knew this was going to be a breakthrough, a breakthrough that would change the way we thought about the interrelationships of trees in the forest, that trees weren't just competing with each other, they were working together.

We've found hard evidence—evidence of the unknown world of a vast underground network of exchanges.

What I really hoped and believed at that time was that this discovery would change the way we do forestry -- from clearcutting and chemically killing trees to something more inclusive, sustainable, practical, and less expensive.

what was i thinking?

I will talk about that later

How can science deal with complex structures like forests?

I'm a forest scientist, so I have to work in the forest, and that's really hard, as I said.

You have to do a good job of escaping the bear

Above all, never give up no matter what difficulties stand in your way

Ask meaningful questions based on intuition and experience

data must be collected and verified

I've done hundreds of experiments in the woods and published them.

The oldest of these experimental farms was established more than 30 years ago.

you can still check

That's how forest scientists study

Now let's talk about science

How did American birch and Douglas fir interact?

They were not just talking in terms of carbon, they were talking in terms of nitrogen, phosphorus, water, informational defense signals, allele chemicals, hormones.

In fact, even before my discovery, scientists thought it was related to a symbiotic relationship called "mycorrhiza" underground.

Mycorrhiza literally means "mycorrhizal root"

Walk through the forest to see the reproductive organs of trees

mushrooms are

But mushrooms are just a small part of the story. From the stalks of mushrooms, mycelium grows and forms mycelium, which grows and propagates on the roots of all plants, including trees.

When fungal cells meet with root cells, an exchange of nutrients and carbon takes place. Mycorrhizal fungi spread in the soil, enveloping each soil particle and absorbing nutrients from there.

The mycelium is so dense that every step we take is hundreds of kilometers of mycelium.

Mycelium also connects not only trees of the same species, but also different tree species, such as birch trees and fir trees, acting like the Internet.

Like any network, mycorrhizal networks have nodes and links.

We created this map by examining every single short DNA sequence of each tree and mycorrhizal fungus in a corner of the Douglas fir forest.

The circles in this picture are the nodes of the Douglas fir, and the lines are the links that are connected by mycorrhizal fungi.

The largest, darker nodes are the most frequently active trees.

We call these hub trees, or, more affectionately, mother trees, because these hub trees take care of the young trees in the underbrush layer.

You can see the yellow circles, which are seedlings that have taken root within the network of the old mother tree.

In one forest, one mother tree can be connected to hundreds of other trees.

Using isotope tracers, we found that the mother tree provided extra carbon to the seedlings in the shrub layer through the mycorrhizal network, quadrupling the survival rate of the seedlings.

Everyone's child is cute. Can Douglas fir recognize his child? So that mother bears know their cubs

So I did an experiment where I grew saplings from the mother tree together with saplings from other trees.

Then the mother tree does recognize her child.

The mother tree keeps her children under her protection and expands her mycorrhizal network.

I send more carbon underground to my children.

They also keep their roots from spreading too far, creating a place for their children to grow their roots.

When the mother tree is injured or dying, it passes on the wisdom of life to the next generation.

What the isotope tracers pinpointed was that carbon was being sent from the injured mother tree, through the trunk, to the mycorrhizal network, and to the young trees around it, along with protective signals.

And the combination of the two makes the young trees more resilient to future stresses.

yes the trees speak

(Applause) Thank you.

As trees converse with each other, they strengthen the resilience of their entire community.

It's reminiscent of our social communities, our families, though some families aren't.

(Laughter) Let's get back to the topic.

A forest is not just a collection of trees, it's a complex system of hubs and networks, with many layers of connections within that connect trees and allow them to interact, provide a means of information exchange and adaptation, and enhance the forest's ability to regenerate.

Because there are many hub trees and overlapping networks.

But forests are very vulnerable, and they suffer from natural hazards, such as bark beetles, which like to attack old, large trees, but also selective logging and clear-cutting, which targets large trees.

You might think it's just one or two habu trees, but even if that much is lost, the forest won't be able to recover. Habu trees are different from airplane parts and rivets.

If one or two of the rivets come off, the plane will still fly, but if a deadly one comes off, or if the rivets that hold the wings come loose, the system collapses.

Now, has your view of the forest changed?

(audience) yes

Sounds good

I'm happy

Remember, I said earlier that I hope my research findings will change the way forestry works.

I'd like to see if that's the case here in western Canada, 30 years from now.

It's a forest on the border of Banff National Park, about 100 miles west of here.

Many areas have been cleared

not much nature left

In 2014, the World Resources Institute released a report that said Canada was the most deforested country in the world in the last decade, and you probably thought it was Brazil.

Canada's deforestation rate is 3.6% per year

My estimate is that it's about four times the renewable harvest rate.

Such large-scale destruction has been shown to adversely affect the water cycle, disrupt wildlife habitat, and release greenhouse gases into the atmosphere.

In addition, by planting only one or two specific species and continuing to cut down aspen and birch trees,

Forests become oversimplified and less diverse, and trees become less resistant to infections and pests.

As climate change progresses, every scourge is turning into a state of emergency, with extreme events such as the spread of pine beetle outbreaks across North America and the massive wildfires that have raged in Alberta over the past few months.

I'd like to move on to the last question: How can we strengthen forests to combat climate change without undermining them?

The beauty of forests, as complex systems, is their limitless self-healing power.

In our recent experiments, we found that by partially clearcutting to leave hub trees and sustaining regeneration of diverse tree species, genes and genotypes, the mycorrhizal network recovers very quickly.

With this in mind, I propose four simple solutions.

There is no excuse for being too complex to act

First of all, everyone has to go to the forest.

We should restore the relationship between communities and forests.

Most forests are now managed in a uniform way, but to successfully manage a forest you need to know the local conditions.

Second, we must leave the old-growth forests.

This is because primeval forests are a treasure trove of genes, mother trees, and mycorrhizal networks.

We should reduce deforestation

It means to refrain from logging, not to prohibit logging.

Third, when we cut trees, we need to preserve the ancient nature, the mother tree, the mycorrhizal network, the trees, the genes, etc., so that the wisdom of the mother tree can be passed on to the next generation of trees, so that the young trees can meet the obstacles they face in the future.

we should take conservation seriously

Fourth, and finally, to regenerate our forests into species-, genotypic-, and structural-diversity forests.

Give nature the tools it needs and let it heal itself.

In forests, trees aren't just competing for survival, they're wonderfully cooperative.

My dog ​​Jiggs says

Ziggs fell into an outdoor toilet and led me into this hidden world and changed my view of the forest.

I hope that my talk has changed your view of the forest.

thank you

(applause)

Whenever I go anywhere for work, I always check where my drinking water is and where my poop and pee go.

(Laughter) Because of this, my family nicknamed me "Poop Princess."

But thinking about where our poop is going is the first step in unlocking the incredible power that our poop and pee hold.

(laughs) It's true.

If you use it well, you can live a healthier and more beautiful life.

Look at this landscape in Santa Fe, New Mexico.

What words and feelings do you associate with it?

It's actually land irrigated with treated sewage.

Did your impression change?

I guess

Just this is good

How you receive this is directly indicative of how innovative a person can think.

Now I want to explain how this is going, but I'm not sure what words to use.

It's okay to use vulgar words like "shit" and "shit", but my grandmother won't watch it anymore.

I don't like childish words like "poop" and "pee"

The more scientific terms "feces" and "feces" don't sit well with me either.

So let's mix it up

(Laughter) Because there's no other way. (Laughter) In this suburban neighborhood, the poop, the pee, the wash water, right in the middle of the district, go to this treatment facility.

It looks more like a park than a sewage treatment plant.

The poop in the bottom layer of layers of gravel -- untouched by anyone -- is a nutritious fertilizer for the wetland plants here.

The final clear, clean water that emerges from this facility flows through underground channels to supply the gardens of the local residents, house by house.

It's what makes it an oasis at home, even in the desert.

This approach is called "integrated water resource management," or "holistic," "circular."

Whatever you call it, it's impossible in conventional environmental hygiene, because it's common sense to "contain," "treat," and "discharge."

But this new method goes one step further.

It's designed with reuse in mind from the very beginning. Anything will eventually be reused.

This often creates really nice spaces.

But the most important thing about this system isn't the technical side of how it works.

It's a matter of feelings

Is this the system you want in your own garden?

If you don't want it why?

I was very curious about the answer to this question.

Why isn't there more innovation in environmental health?

Why can't this kind of thing become common sense?

This question bothered me so much that I started working for a nonprofit called Recode.

An organization that aims to promote sustainable construction and development

An organization that seeks innovation

But the innovations themselves -- the ones that have the potential to enrich our lives -- are often illegal.

The laws and norms of modern society are built on the premise that the best practices of the time they were created will remain the best practices forever, even though they are periodically tweaked.

Innovation doesn't always happen piecemeal

How we perceive any new technology affects everything we do, how we talk about it, how we use it to motivate people to learn, whether it's making jokes or making norms.

How innovative we can be is ultimately up to how we feel.

So this is the number one reason why there is no innovation in environmental health.

No one likes to talk about environmental hygiene, and that's why I became a poop princess.

Second, because people think that America's environmental health problems are solved.

but that's wrong

Here in America, there are still people who drink poop-laced sewage and get sick.

Seven million people get sick and 900 die each year.

No comprehensive effort has been made to remedy this situation.

I'm not on my way to a solution

In my city, Portland, Oregon, you can't even let your dog swim during the rainy season, because the sewage is dumped straight into the river.

Rainwater and sewage go to the same sewage treatment plant.

When it rains too much, sewage flows into rivers.

It's not just a Portland problem

40% of municipalities self-report that they discharge partially treated or untreated sewage

There's another disappointing thing about our current situation: half of our poop and pee is used as fertilizer on our farms.

the other half will be incinerated or buried in landfills

This is a pity because everyday poop is packed with a lot of nutrients.

It's a good match with livestock pig manure compost. We humans are omnivores, and pigs are omnivores too

A smoothie full of nutrition for our poop and pee trees

(Laughter) Another unfortunate thing is that the drugs we take are quickly washed out into public water bodies.

A sewage treatment plant can only remove about half of the chemicals in the sewage that flows into it.

The other half comes out as treated water.

Think about how water mixed with pharmaceuticals, hormones, steroids, painkillers, and other juices can affect fish, dogs, and children.

But I'm not just saying that this is a problem that should be prevented.

And if you look at it the other way around, this situation also offers solutions to a lot of other problems.

If you're skeptical about this idea, just imagine, you can use all these technologies, and you've got this awareness: "We're going to reuse it."

Let's design beautiful reusable shapes." "Advanced potty training."

(Laughter) You can take it now.

I think we already have a culture of advanced potty training.

There are three good reasons to start today.

one because it becomes fertilizer

The poop and pee that we all produce can feed half or all of our food, depending on our diet.

What is the reason why the poop in the toilet is dark brown?

dead bacteria

this is carbon

When you mix that carbon into the soil, it binds with other minerals and nutrients.

Hey! healthy food preparation

Jajan! Building healthy people

And chemical fertilizers don't have carbon in them to begin with.

If we could use the livestock manure and manure that we currently throw away to fertilize our soil, we might not need to rely on fossil fuel-derived fertilizers or far-flung minerals.

It should be a huge reduction in energy consumption.

Now, some of you may be concerned about this recycling cycle being polluted by industrial pollutants.

This issue can be addressed

First, we need to get rid of the discomfort of talking about poop and pee, so we can calmly discuss how we want to reuse things and what we don't want to do.

What I want you to understand is that changing the way we approach environmental health is also the first step toward mitigating climate change.

I told you about the carbon in poop.

If we mix this carbon into fallow soil, the soil will begin to absorb the carbon dioxide we emit.

I hope that global warming will be mitigated.

The people I'm going to show you are the tough ones who have taken the courage to embrace the potty-training approach.

Why did these people in New Mexico do that?

Is it because it's a desert area? for savings? of course it is

But the bigger reason was the emotional part, because I was comfortable with seeing the things I was flushing down the toilet as a resource.

This is a typical house in Portland.

What's really cool about this house is that it has a compost toilet, and over time, people's poop and pee become a soil conditioner.

Wash and shower water is channeled underground through pools of mulch to the orchards below.

When I applied for permission to build this system, it was illegal in Oregon.

It was legal in five other nearby states.

Legalizing this became the goal of my organization Recode's first campaign.

Let me give you an example where the approach with Integrated Water Resources Management was the lowest cost.

This is a high-rise apartment building in downtown Portland, but it doesn't use a sewage treatment plant.

how are you doing

For example, flush water is used to flush toilets, to cool machines, and to irrigate greenery.

After using up everything in the condominium, the leftovers are treated to the highest standards using plants and bacteria on the same property, filtered, and then join the groundwater directly below.

It was cheaper than putting all this together and building a new sewage treatment infrastructure.

So that's the third reason why you should be excited about doing it differently, because it's going to be pretty cheap.

It was the first time in Oregon that such an effort was allowed.

Courageous and free-thinking people said with confidence, "I can make fun of this."

(Laughter) I said, "Let's try it."

(Applause) Right?

All the time, you've been showing us examples of people reusing everything locally.

Why you ask

The old infrastructure is getting old, right? Three-quarters of the cost of updating it goes to the pipes that run all over the city.

So it might make more sense to set up a separate treatment reuse system as part of a new build or refurbishment.

San Francisco realized this and started a program to subsidize every household to reuse their washing water and rainwater to water their gardens, because it saves a lot of water for the whole district.

Why is this initiative so revolutionary?

Of course the money aspect

But the bigger reason is the acceptance of "advanced potty training."

What if we embraced innovations in environmental health the way we embraced, say, solar power?

See, solar power was rare and unaffordable before, wasn't it?

Now it's playing an unprecedented role as part of the power grid.

Reliable in times of need

We now have energy sources like the sun that are not affected by what happens on the surface of the earth.

What is the driving force behind this technological innovation?

We are none other than us

We are talking about energy resources, right?

It's nice to talk like that

Some people are talking about the current energy resource depletion problem.

We all look to the brightest minds of mankind for solutions, everything from better solar panels to better batteries.

So let's talk about where our drinking water comes from and where our poop and pee actually go.

If you can get over your discomfort with these topics, there's a potential for future treasure troves here.

Every time you flush the toilet, think, "Where does my poop and pee go?

Will I get a good job?"

(Laughter) "Or maybe it's a big deal in some waterway."

If you don't know, let's find out

If you don't like the answer you're getting, figure out a way to tell the people who can push for this reform that you're advanced potty trained and ready to go back.

Our hearts will determine the future of innovation

thank you

(applause)

"What kind of person do you want to be?"

It's a simple question, and whether you know it or not, you answer it every day with your actions.

There's nothing more important to your success in society than this question, because it's all about how you look and how you treat people.

Do you uplift others by making them feel valued, valued, and listened to, or do you hold them back by making them feel insignificant, insulted, marginalized, and marginalized?

It all depends on what kind of person you want to be.

I study the effects of rudeness on people.

What is "rude"

arrogance and rudeness

There are many different types of rude behavior, such as mocking someone, disrespecting someone, teasing someone in a hurtful way, telling an offensive joke, or touching a cell phone during a meeting.

What is rude to one person may be perfectly fine to another.

For example, touching your phone while someone is talking to you

Some may find it disrespectful, while others may consider it perfectly acceptable.

it's totally different from person to person

It's entirely up to the recipient, and whether or not they find it rude.

Even if you don't mean it that way, it won't do you any good if you make the other person feel that way.

More than 22 years ago, I still vividly remember the moment I walked into a stagnant hospital room.

It was incredible to see my father, who was strong, strong and energetic, lying on the bed with electrodes attached to his bare chest.

It was work stress that drove my father there.

For over a decade, I was tormented by a rude boss.

At the time, I thought that such a rude person was rare.

But within a few years, I myself had suffered and witnessed many instances of rudeness, and it was my first job out of college.

For a year, I would come to work every day and hear my co-workers say things like, "Are you stupid? How can you do that?"

of course i quit my job

I went to graduate school to study the effects of this kind of behavior.

It was there that I met Christine Pearson.

Christine's theory was that even minor misbehavior could lead to much more serious problems, such as aggression and violence.

Under the belief that bad manners affect business performance and revenue

We started doing research, and the results were eye-opening.

Send out survey questionnaires to people who have graduated from business school and are working in various organizations.

They were asked to write a few lines about a time they were treated with disrespect, disrespect, or insensitivity, and to answer questions about how they reacted.

One person was told by his boss that he'd belittled him by saying, "This is a job that even a kindergartener could do."

And rudeness was found to be demotivating: 66% of respondents put in less effort, 80% wereted their time on the incident, and 12% quit the company.

After we published the findings, two things happened.

One is an inquiry from a company organization.

Cisco took a look at these results and took a small portion of them, and came up with a conservative estimate that the company was losing $12 million a year due to its misbehavior.

The other is to ask researchers in the same field, "The answers are self-reported. How do you prove it?"

Is it really going to interfere with my work?"

I was also interested, so I enlisted the help of Amira Erez.

We compared those who received rudeness and those who didn't.

It turned out that those who suffered rudeness suffered more from their jobs than those who did not.

You may say, "Well, that makes sense."

"It's only natural that it's going to get in the way of work," he said.

What about the non-participants?

What if I just saw and heard?

i mean eyewitness

I was wondering if witnesses would be affected as well.

So we did a study, where five subjects witnessed an experimenter being rude to someone who was late.

The experimenter said, "You're crazy. It's irresponsible of you to be late.

Aren't you ashamed, aren't you disqualified as a member of society?"

We also looked at what happens when one member belittles another in a small group.

And what we found was really interesting: the quality of eyewitness work went down, not just a little, but a lot.

Rudeness is like the flu

It's contagious. Everyone becomes a carrier just by being around them.

It's not just about the workplace

This virus can spread anywhere, at home, online, in schools and in the community.

It affects our emotions, our motivation, the quality of our work and the way we treat others.

It can even interfere with your ability to concentrate, and it can even impair your ability to think.

Moreover, this phenomenon can occur even if you have not been treated to rudeness or witnessed

It can happen just by seeing a disrespectful word.

Let me explain with an example

We gave the subjects a list of words and asked them to make a sentence.

But in fact there is another side

Half of the subjects were given a list of 15 words associated with rudeness, including "callous," "disturbing," "obnoxious," and "annoying."

The word list given to the other half of the subjects has none of those words.

And the results were shocking: people who were given words associated with rudeness were five times more likely to miss the information in front of them on their computer screens.

A follow-up study found that people exposed to words associated with rudeness were slower to make decisions and record responses, and made significantly more errors.

Especially in life-or-death situations, it can lead to disaster.

Steve, a doctor, told me about a fellow doctor who was always arrogant, especially with the staff and nurses under his command.

One time, this doctor yelled at the medical team.

And shortly after that, the team misdosed the patient's dosage.

The correct information was on the chart in front of us, but somehow the whole team overlooked it.

Lacking concentration and situational awareness, he seems to have overlooked the information.

I think it's a simple mistake

but the patient died

Also, Israeli researchers have demonstrated that the medical team present at the scene of disrespectful behavior suffered a drop in the quality of their diagnosis and even the quality of their care.

The main cause was that medical teams who encountered disrespect were reluctant to share information and didn't ask for help from their peers.

It's happening in every industry, not just in medicine.

So if rudeness is so harmful, why is it still so prevalent?

I wondered, so I researched this as well.

Stress is the biggest cause

I don't have the patience

Another reason people lack courtesy is that they question, even consider it a problem, to behave politely and nicely.

I don't think you look like a leader with that kind of attitude.

They think that "good-natured people lose money" and so on.

It is also said that ``the bad guys get promoted''.

(Laughter) It's a no-brainer, especially when you're talking about a few people who seem to exemplify it every day.

But in the long run, the results are just the opposite.

By Morgan McCall and Michael Lombardo when they were at the Center for Creative Leadership

An in-depth study revealed that the "biggest mistakes managers make" is being callous, heartless and overbearing.

Everywhere there are people who are exceptionally successful despite their rude behavior.

But sooner or later most people who are rude come to a cost.

Bad managers get rewarded when they're vulnerable or need something.

no one will help

What about good people?

Are polite people rewarded?

That is right

Also, being polite isn't just about not being a nasty person.

Not holding people down and lifting them up are two different things.

A truly polite person pays attention to the little things, whether it's a smile, a greeting in the hallway, or a really good ear.

You don't have to bend your opinion. It's okay to confront people, disagree with them, criticize them. Just treat them with respect and courtesy.

It's an attitude that's sometimes called "absolute candor." It's the honest, compassionate criticism of the individual.

Yes, politeness pays off

At a biotechnology company, my colleagues and I discovered that people who appear well-mannered are twice as likely to be viewed as leaders and perform significantly better at their jobs.

Why is politeness rewarded

Because it's found in important and influential people. It's a rare combination of two main traits: warm and capable, and friendly and smart.

In other words, politeness isn't just about motivating others.

It is also related to my evaluation.

Polite people tend to be seen as leaders

They do a good job and are seen as warm and competent.

But the benefits of politeness go much further, and lead directly to one of the most important leadership-related questions: What do people most want from a leader?

After collecting data from 20,000 adults around the world, the answer was simple: Respect.

They found that being treated with respect was more important than being recognized and appreciated, and being treated with respect, even more than helpful feedback and learning opportunities.

People who feel respected are healthier, work harder, are more likely to stay in the organization, and are more engaged in their work.

so where do we start

How can you lift people up and make them feel respected?

Thankfully, no major reorientation is required.

Little things can make a big difference

I've personally found that saying thank you, sharing success, being a good listener, being humble about asking questions, acknowledging and smiling can all work.

Patrick Quinlan, former CEO of Oschner Health Systems, told me about the effectiveness of the 10-5 rule that his company practices. If you're within 10 feet of someone, make eye contact and smile. If you're within 5 feet of someone, say hello.

This courtesy spread throughout the company, leading to higher patient satisfaction and more referrals to other patients.

Politeness and Respect Helps Organizations Perform Better

When my friend Doug Conant took over as CEO of Campbell's Soup in 2001, the company had just halved its market share.

Sales have plummeted and many employees have just been laid off.

A Gallup rep reported that employee engagement was the worst of any company he'd ever surveyed.

When Doug came to work on his first day in office, he saw the barbed wire fence surrounding our headquarters.

There was even a watchtower in the parking lot.

It was like a low security prison.

It was an unhealthy atmosphere

Doug reversed the situation in five years.

And in nine years, the company continued to break record-breaking performance, winning awards after awards, including being the #1 company to work for.

The method that Doug took

On the first day, I told my employees that I had high performance goals, but that I would achieve them with politeness.

I practiced it myself, and I demanded it from my subordinate leaders.

For Doug, it was all about being hard at work and nice to people.

Also, it's all about touchpoints -- how you interact with your employees on a daily basis, whether it's in the hallway, the cafeteria, or the meeting.

If Doug handles each touchpoint well every time, employees feel valued.

In addition, to make his employees feel important and to show that he cares about each one of them, Doug handwritten over 30,000 thank you letters to his employees.

This set an example for other leaders.

Leaders have about 400 touchpoints like this every day.

Most touchpoints don't take long, less than 2 minutes at a time

The important thing is to be tactful and caring every time, every time.

Politeness Elevates Others

Encourage them to contribute more and work at their best.

Rudeness undermines surroundings and performance around them.

Just being in a place where rudeness is happening robs you of your potential.

What I know from my research is that when people behave in an environment of politeness, they're more productive, more creative, more kind, happier and healthier.

improvement is possible

It's up to each of us to take more care and take action to lift those around us, whether at work, at home, online, in school or in our communities.

With each interaction, ask yourself, "What kind of person do I want to be?"

Let's end the epidemic of rudeness and spread politeness

I'm sure it will bear fruit

thank you

(applause)

The burgeoning narrative of Africa is being challenged.

About 10 years ago, I told you a story about Africa, an Africa of hope and potential, an Africa of entrepreneurship, a far cry from the usual picture of Africa of death, poverty and disease.

What we talked about then has now become part of the story of a booming Africa.

Here are two stories that symbolize this booming Africa.

First, let's talk about Rwanda, a country that has endured countless hardships.

So Rwanda decided to become a technology hub, one of the centers of the African continent.

This is a country with a lot of hills and mountains, which is a bit like where we are right now, but it's a pretty tough terrain to get services to people.

So what is Rwanda's solution?

Using drone technology to save lives by delivering medicines, vaccines and blood to isolated areas and developing life-saving plans, by partnering with a company called Zipline and courier companies like UPS and Gavi, the global alliance of vaccines.

I made a plan to save lives.

It's an example of the innovation Africa needs to leapfrog.

The second story is one that most of you are familiar with, that you've seen or remembered.

African countries are plagued by disasters caused by droughts and floods, and the frequency of disasters is increasing due to global warming.

When disaster strikes, they seek help from international aid.

I'm sure you've seen press photos of a child's face covered in flies and dead animals.

But in these countries -- 32 countries, actually -- we launched an organization called African Risk Capacity under the auspices of the African Union.

what does the organization do?

It's a weather insurance scheme. Each year, participating countries put aside about $3 million in insurance money each year. When droughts and floods occur, the insurance pays out and can be used to help people without waiting for international aid to arrive.

ARC gave $26 million to Mauritania, Senegal and Niger last year

1.3 million drought-affected people helped

They put their livelihoods back together, they fed the cows, they fed the children, they kept the people in their communities, and they stopped them from leaving.

Stories like this show that Africa has become more self-responsible and self-sufficient.

But now, even this narrative is being challenged: the growth of the African continent has stagnated for the past two years.

The economy, which has grown at 5 percent a year for the past 15 years, is expected to grow at 3 percent this year. Why is that?

Commodity markets are declining due to the increasingly uncertain global situation.

Most of the continent's economy is fueled by resource exports, so growth is bound to slow down.

Brexit also contributed to the decline

I didn't foresee a Brexit happening, nor did I expect its impact to be a destabilizing factor in world affairs.

That's what we find ourselves in right now, so it's time to take a look at what African countries did right and what they did wrong.

let's clarify

How can we learn from this, and how can we strengthen it so that Africa can continue to thrive?

Here are six things that were done right.

First, economic management has improved.

The 1980s, the 1990s were a lost period, and African economies were suffering. Some of you may remember the cover of The Economist, where the headline proclaimed "Lost Continent."

But as we entered the 2000s, policy makers realized that maintaining social stability required efficient macroeconomic management, keeping inflation in the single digits, keeping budget deficits below 3 percent of GDP, and providing a stable environment for domestic and foreign investors to increase the confidence to invest in those economies.

that was the first

Second action is debt

In 1994, with a debt-to-GDP ratio of 130 percent, there was no financial headroom.

I couldn't invest the assets I was hoarding into development, and I was struggling to pay off the debt.

I'm sure some of you in this room have helped a lot of African countries with their debts.

Private creditors, multilateral, bilateral creditors came together to apply the Heavily Indebted Poor Countries Initiative to provide debt relief.

Debt assistance, established in 2005, has worked to bring down the debt-to-GDP ratio to about 30 percent, creating room to reinvest surplus assets.

The third is measures for deficit companies

Until then, the government should be involved in the management of the companies, and of course that shouldn't be the case.

I dabbled in corporate management and was making losses.

Some companies undertook management reforms, promoted commercialization and privatization, and some companies went out of business, and in doing so, they also eased the burden on the government.

The fourth is very interesting.

When the telecommunications revolution came, African countries followed suit.

In 2000 there were only 11 million phone lines

There are currently 687 million cellular connections on the continent.

As a result, mobile communication technology has accelerated further, and Africa is at the forefront of some technologies.

Kenya, for example, has developed a mobile currency, and you all know M-Pesa, which is a mobile money transfer service, but the truth is that in this particular area, Africa was the leader.

The spread of this mobile currency opens up the possibility of using alternative energy sources.

People now have a way to pay for solar power the same way they buy a data card for their cell phone.

This is solid progress and has produced good results.

We've also invested in education and health care, and it's not enough yet, but it's showing some impact.

250 million children have been vaccinated in the last 15 years

Secondly, the number of armed conflicts has decreased.

Conflicts on the Continent Continued

It is a fact that many people acknowledge

Their numbers are dwindling, and some of their leaders even managed to quash a coup.

On the flip side, a different kind of conflict emerged, which I'll explain later.

Based on all of this, there are some changes, and this is what I want you to be aware of. The uncertainty about the future, of course, remains real, but among others -- Ivory Coast, Kenya, Ethiopia, Tanzania, Senegal, etc., which are currently on a growth trajectory.

So what kind of mistakes did you make?

8 points can be pointed out

It goes without saying that there are more mistakes than right actions.

(Laughter) I made eight bad decisions.

First, there was economic growth, but not enough job growth.

failed to create jobs for young people

Youth unemployment is about 15%, and underemployment is an even bigger problem.

The second point is that although there was growth, the quality of the growth was insufficient.

Employment increased but was unproductive, simply moving workers from low-productivity agriculture to low-productivity commerce and work in the urban informal sector.

Third, the gap between rich and poor has increased.

created a millionaire

The wealth of 50 millionaires with $96 billion in market capitalization exceeds the combined wealth of the continent's 75 million low-income people.

And then poverty -- and this is my fourth point -- it went down as a percentage, but it didn't go down in absolute numbers because of population growth.

And the problem of population growth also lacks sufficient dialogue on the continent.

This problem needs drastic action, especially when it comes to how girls are educated.

It is a way to solve the problem of poverty.

Fifth, we didn't invest enough in infrastructure.

Chinese capital investment progresses

As a result, some countries were helped, but not enough.

If you look at electricity consumption on the continent, the sub-Saharan countries as a whole and Spain are on par with each other.

Total consumption is the same as in Spain

It means that many people still live in darkness, and as the president of the African Development Bank recently said, Africa cannot develop while it is in darkness.

One of the remaining challenges is that the economic structure of each country has remained unchanged for decades.

Despite the growth, the structure of the economy has not changed significantly.

By relying on exporting resources, we are, in effect, exporting jobs.

Manufacturing value added remains at 11%

Youth employment isn't creating decent manufacturing jobs, and there's still not enough trade between countries.

Trade between African countries is still at a level of around 12%.

This also remains an issue

Governance Efforts

management control is very important

But the institutional base is weak, and in some cases almost nonexistent, resulting in widespread political corruption.

Corruption is something we haven't really tackled yet, but it's something that needs to be tackled, and we need to be more transparent about how we manage our economy and our finances.

We also need to raise our vigilance against emerging conflicts, especially non-traditional ones, like the suppression of Boko Haram in my country, Nigeria, or al-Shabaab in Kenya.

In particular, we should form partnerships with overseas collaborators and deal with them together with the help of developed countries.

And when you screw it up, you create a new reality, a reality that shouldn't exist in a rising Africa.

The last point is about education

the education system is broken

Because we haven't created the technology we need in the future.

We need a more effective education system

The above points are left as issues

So what direction should we take from here?

Understand the factors that lead to success

When people and nations experience success, they forget the roots of their success.

It's extremely important to know what you're good at, and to master and maintain it.

The right policies that we've done need to learn to replicate this and repeat the right policies.

It's imperative that we steer the economy and promote stability, keeping prices calm and coherent policies in place.

Often we are inconsistent

When one regime falls, a new one comes to power, abandoning even the policies that worked each time.

What are the consequences?

It invites public distrust and creates anxiety for companies.

Should I keep investing? What should I invest in?

Debt -- we should maintain the success we've had in reducing debt. But in recent years, we've seen borrowing rise again, and the ratio of debt to GDP has risen.

managing success

Second, focus the laser beam to pinpoint where it didn't work.

The priority is to develop infrastructure.

Most countries understand the need to invest here and are doing their best to do so.

it is desperately needed

Securing energy sources is the top priority.

There can be no development in the dark

Governance and Corruption Issues - These are the things we must continue to fight

It is imperative to increase the transparency of each country

And above all, it's important to promote youth participation.

The younger generation has a lot of hidden talent

I see that fact every day

That fact is what motivates me to wake up every morning and do my best.

We need to unleash the potential of young people. We need to support and pave the way for creativity and innovation so that it doesn't get in the way of young people.

I am confident that their power will guide us.

Recognize that the power of women and girls is also a gift to us.

They have a hidden power, and our duty is to unlock that potential. By doing so, we can expect them to contribute to the continent.

If we can do all of these things, I am convinced that the story of Africa's breakthrough will be a trend, not a coincidence.

By sustaining this trend, by unlocking the potential of young people, and by unleashing the shackles of women, the uptrend becomes evident, even if there are setbacks and stagnation at times.

Africa's breakthrough can continue

I want to say to the businessmen in this room that if you invest in Africa, it's not for today, it's not for tomorrow, it's not for short-term profit, it's for the long-term.

If we don't invest in Africa, we're missing out on the most important potential emerging in the world today.

thank you

(Applause) KELLY STETZEL: You touched on the issue of corruption.

As a result, we are also suffering

There is also resistance, and your mother has also been kidnapped.

How are you coping with this?

Ngozi Okonjo-Iweala: It's difficult.

Thank you for contacting me about my mother's kidnapping.

It's a very difficult issue

But fighting corruption is like touching the pockets of someone who stole your money, and they're not silent.

The problem is when they resist and threaten you, surrender or keep fighting.

Can you find a way to stand still and fight?

The team that worked with me answered that we have to keep fighting.

create a system

Create a system to prevent property from being stolen, which will be the foundation of the future

tried to do something like that

After leaving the government, he continued to make the same claims.

In our country, if we don't fight corruption on our own, nobody will fight for us.

There are sacrifices to be made for that, and we have no choice but to do our best in such circumstances.

Thank you to everyone in the room and to everyone at TED for giving us a space to speak. Let's say to those who stand in our way: You're no match, we're not intimidated.

thank you

(Applause) Stetzel: Thank you for your wonderful talk and your worthwhile efforts.

(applause)

It's been three days since I started working for one of Silicon Valley's hottest startups -- early 2013.

There were a dozen engineers in the room, but I was the only one who was twice as old as everyone else.

I was hired by that company because I was a seasoned expert in my field, but in that room, I felt like a newbie surrounded by tech geniuses.

As I listened to the discussion, I thought that I had no choice but to become an invisible person.

And all of a sudden, the 25-year-old genius who was running the meeting looked at me and said, "How can you say that if you put a feature out there and no one used it, you got it out there?"

(Laughs) "The function was sent to the world"?

In that moment, I realized that I was actually "behind the world."

(Laughter) I had no idea what he was talking about.

I was embarrassed to keep quiet, so he took the time to talk to someone else.

I buried myself in my chair and wished that the meeting would be over soon.

This is my beginning at Airbnb

When three millennial co-founders invited me, I was asked to turn this fast-growing technology start-up into a global hospitality brand, and to be their personal mentor to CEO Brian Chesky.

I was a boutique hotel entrepreneur between the ages of 26 and 52, so I was fairly familiar with the area, and I think I had some knowledge of the hospitality industry.

But after the first week, I realized that the bold new industry of home-sharing didn't need much insight into old-fashioned, traditional hotel management.

A cruel reality hit me What can I offer? and

I never worked for a tech company

Five and a half years ago, I had never heard of the "sharing economy," nor had I used the Uber or Lyft apps.

It was a world I didn't know

So at the time, I thought to myself, either I'm going to scramble to find a safe haven, or I'm going to label these geniuses as "just young," or maybe I'll be curious instead of juxtaposing and merging my expert eyes with their new eyes.

I felt like Margaret Mead in Samoa, surrounded by aboriginal boys and girls, and I quickly realized that I had as much to give as I could get from them.

The more I touch and learn from each generation, the more I realize that we often don't trust each other enough, that we often don't share their wisdom.

Even though we know each other's boundaries, we don't necessarily trust each other enough to share the wisdom of each generation.

Looking at the modern workplace, I strongly believe that modern intergenerational trade agreements open up pipelines for the sharing of wisdom between generations, enabling them to learn from each other.

Nearly 40 percent of people in the United States have a boss who is younger than them, and that percentage is growing rapidly.

The reason power is pouring into young people like never before is the country's growing reliance on DQ, a digital intelligence quotient.

As young people start their companies in their early 20s and grow them into some of the world's largest companies before they're even 30, we expect these young digital leaders to somehow manage to harness the relationship wisdom that older workers like us have cultivated over the years.

It takes time to develop your emotional intelligence (EQ).

There's ample evidence that gender- and ethnically-diverse companies are more efficient.

What about your age?

This is an important issue, because we've never had five generations unintentionally coexisting in one workplace.

It may be time for us to become more aware of how we work as a whole generation.

A number of studies in Europe have demonstrated that teams with a wider age range are more efficient and successful.

So why is it that only 8 percent of companies that embrace diversity and inclusion have actually scaled up this strategy to consider not just gender and race, but age as a percentage of their workforce?

Maybe we're just unaware of the obvious fact that the world is aging We may just be unaware of the obvious fact that the world is aging

One of the modern paradoxes is that while baby boomers are more active, healthier, and work longer than their predecessors, they also develop feelings of uselessness.

Some people feel like they're old milk, with an expiration date stamped on their wrinkly forehead.

For many of us middle-aged people, this isn't just an emotion, it's a harsh reality: suddenly you lose your job, you don't hear from anyone.

Many of us are justifiably concerned that our experience is seen as a liability rather than an asset.

There's this old saying -- and it's probably fairly recent -- that "At 60, you're physically the same as you were at 40."

You get it, right?

But when it comes to power in the modern workplace, 30 today is like 50 years ago.

It's a fun place to work

(Laughter) In fact, people in power are 10 years younger.

our life expectancy is 10 years longer

please calculate

There's a new 20-year gap in society.

In the past, "middle age" meant ages 45 to 65, but now it's fair to say that the term "middle age" has extended to 40 years, from age 35 to 75.

but there is also hope

Why do people get smarter and wiser as they get older?

You may have your physical prime in your 20s, your money and your income in your 50s, but your emotional peak is in middle age and older, because you develop more pattern recognition about yourself and others.

So how can companies harness the wisdom of their middle-aged employees in the same way that they nurture young digital geniuses?

The most successful companies, both now and in the future, are those that master the alchemy of merging the two and transforming them into a powerful relationship.

The alchemy at Airbnb got me to this point where I had a young, smart partner who helped me grow the hospitality sector.

Laura Hughes knew early on that I was confused about the world, and she would often sit next to me in meetings and explain technical terms to me, and when I handed her my notes, she would explain what they meant.

Laura was 27 at the time, had worked at Google for four years, and had been at Airbnb for a year and a half when I met her.

Like many of her millennial peers, Laura first worked her way up to managerial positions in the field, and only then underwent formal leadership training.

Whether it's B2B business, B2C, C2C or A2Z, it doesn't matter. Business is fundamentally H2H. In other words, it's people.

But Laura's approach to leadership, learned in a world dominated by technology, was entirely numbers-based.

In the first few months, they said, "Your approach to leadership is amazing. When you create a compelling vision, it guides us."

My "fact" knowledge is How many rooms does one maid clean in eight hours? etc., may not be so important in the world of home-sharing.

But my knowledge of the "process" — the deepest motives of everyone in the room

Things like "how to get things done" based on understanding were invaluable knowledge, because very few people in this company had a lot of organizational experience.

As I worked at Airbnb, I realized that it was possible to find new ways of working with older people.

I'm not talking about old people from the past who were worthy of respect.

A remarkable feature of the elderly today is their adaptability, their ability to apply timeless wisdom to contemporary problems.

Maybe it's time to make wisdom as important as innovation.

Maybe -- not "maybe," but definitely yes, but it's time to re-modify the word "elderly."

Today's seniors are as much apprentices as they are mentors, because in a world of rapid change, their "novice minds" and "catalytic curiosity" are life-affirming elixir, not just for themselves, but for everyone around them.

Intergenerational improvisation is known in music and art, like collaborations between Tony Bennett and Lady Gaga, or Wynton Marsalis and young jazz musicians.

In business, we sometimes call this kind of improvisational relationship "mutual mentorship." We blend the DQ of millennials with the EQ of Gen X and baby boomers.

I was able to experience this intergenerational reciprocity working with Laura and her excellent data science team when we reinvented and evolved Airbnb's user-to-user rating system, using Laura's analytical thinking and my human-centered intuition.

Using this perfect alchemy of algorithmic and human ingenuity, we were able to develop an immediate feedback loop to help hosts better understand their guests' needs.

A fusion of high-tech and high-touch

Another thing I've learned at Airbnb as a modern senior citizen is that my role is ostensibly an intern, but privately a mentor.

Search engines are great because they give us answers, but smart and sensible teachers ask the right questions.

Google, at least so far, doesn't understand the nuances of the exquisite harmony between the human heart and mind.

After a while, to my surprise, a lot of young Airbnb employees started coming to me asking for personal advice.

But in reality, they were often advising each other.

In short, CEO Brian Chesky invited me in anticipation of my industry knowledge, but what I was actually offering was years of wisdom.

Maybe we should stop using the term "knowledge worker" and replace it with "wisdom worker."

We now live in a world where five generations coexist in the workplace. They can act like they are independent isolationist nations, but they can also start looking for ways to bridge the lines between generations.

And we have to figure out how to switch the way that wisdom flows, so that there's a two-way exchange of wisdom between the older and the younger.

How do you apply this to your own life?

On a personal level, who do you reach out to and build mutual mentorship relationships with?

At the organizational level, how can we create an environment that fosters the flow of wisdom between generations?

This is the new sharing economy

thank you

(applause)

June 29, 2016

Dear Fellow Citizen, I am writing to you today, you who have been defeated by the times.

At this very moment our lives are completely divided and full of malice and fear, but I am writing this letter only to you, though we both know that there are many you behind you, and many I behind me.

I am writing this letter because the shaking of this world we live in has become terrifying.

i think you are too

Some of the things we fear are common to both

But most of the fear seems to be directed at each other.

You're afraid of the world I want to live in On the contrary, I'm afraid of your ideal world

Do you know that feeling that harbingers before a storm comes?

Fellow citizens, do you remember the feeling now?

Those anxieties and worries will be reminiscent of those days in the 1930s.

You probably don't realize it's because the fears we feel for each other don't happen at the same time

Now at this stage, I feel that the fear you feel for me, the fear you feel for the world that I've claimed to be good for both of us, has built up over a generation.

It takes a little while for your fear to give me fear, especially since I never thought I needed to be afraid of you in the beginning.

I heard your voice, but I didn't listen to you All this time you said that this brave new world wasn't great for you and so many others This industrialized world, where men and goods and technology move everywhere at will This open world I enjoyed but you weren't set free

I've walked your streets and seen without knowing

I noticed that the buildings facing the town square in Stephenville, Texas, were lined with nothing but law firms, thanks to all the people who were in and out of prison.

In Wagner, South Dakota, deserted shops and veterans' club meetinghouses stood as a mockery of everyone's old dreams.

In Lancaster, Pennsylvania Too many young people in their twenties and thirties at Walmart They looked like old men waiting to die They were ragged and reddish skinned and gaunt and their hair was ragged and their teeth yellowed and ragged and their eyes were filled with a sense of loss.

The young people I met in Paris, Florence and Barcelona had degrees, but they had nowhere to work. They made their living as interns until they were in their 30s.

I heard the news that a block of London has become a ghost town.The dubious funds of the world's richest people have been poured into empty apartments, robbing the city's longtime residents and young couples of new lives.

I heard that people's lives are being fundamentally destroyed.

I used to be able to work, now I can't even do that

I used to be able to have children and raise them, and promise them a little better life than we did, but now I can't.

I used to be proud of my work, but now I can't

It used to be normal for someone like you to own a house, but not now.

I can't pretend I didn't know these realities, but I turned my eyes away from you suffering on Earth and immersed myself in creating a future where we can live on Mars.

Many of you turned a blind eye to living a shorter life than your parents did, and threw yourself into inventing immortality.

I heard everything but never took it into my head

i saw but didn't recognize

i read but i didn't understand

I started paying attention when you started voting and speaking out and the substance of those actions started to scare me.

I listened for the first time when I went to destroy the Continental Union and elected demagogues.

And finally your pain became my concern

Knowing pain is often the starting point for coping with pain

I regret now that if I had spoken out with you when you were only faintly feeling it, it wouldn't have been the problem that I desperately needed to solve.

I'm asking myself why I didn't stand up with you

Partly because I was obsessed with the charisma of change, I was steeped in the belief that novelty had value in itself, and I believed in globalization, in open borders, in fast-changing diversity.

When my jumble of beliefs resulted in change, I went blind

didn't even think about the consequences of change

I was able to neglect important things like roots, traditions, customs, persistence, and a sense of belonging.

The more I became a fundamentalist of liberation and change, the more I steered you in the opposite direction: to hold on, to stop, to build walls, to belong.

I've come to understand things that I didn't know before, that skin color and organ failure aren't the only types of disadvantage.

Even with these privileged attributes, it's a minor, unspoken feeling that you feel at a disadvantage when history unfolds against your will. The feeling that the past was pleasant to you, and the future will be pleasant to others.The feeling that the future will be pleasant to others.

I don't think in the least that the old sense of privilege should not be undermined.

but it will take time

You'd better be prepared to live in a new age where you don't get special treatment just because you belong to the privileged class.

If your anger turns into hate, know that there is no room for hate in our common society.

But, fellow citizens, I admit that I have underestimated the burden of losing my position.

I forgot that social necessities can hurt someone personally

The same thing happened in our shared economy.

Just in terms of equality and diversity, we can't turn back time, and we don't want to turn it back, but we also have to understand that there's a sense of loss that equality and diversity evoke.

nevertheless you must understand what you have tasted

You've been saying for years that society hasn't changed in the direction that my theory predicted.

Even before you finished your petition, it was hard to live with irregular working hours and inconsistent pay, it was a lack of opportunity, and it was heartbreaking to leave your child in a 24-hour care service to meet your 3 a.m. commute time.

Language is one of the few things we have in common, and I sometimes use this common property to blur things out, to bias things, to justify myself—that is, to paraphrase what's good for me to be good for both of us.

I'll admit it now, but what I was really doing was buying your pain on the cheap, patching it up and selling it back to you under the name "freedom."

I want to make my life smooth I wanted to believe that the society that makes me feel good is the best for you And I wanted you to believe

I haughtily lectured you as if I understood you were voting against your own financial interests and undermining your own interests.

It's just my self-righteous economic theory.

I have a weakness, and it's that people think their only interest is in their own economic interests, ignoring their sense of belonging, their pride, their desire to say something to those who ignore you.

That's how I arrived at it.It's disturbing, but it's not inexplicable.It's an era where rumors are prevalent, society is hurt, foreigners are rejected, and anger and fear are rampant.

But what I fear is that I won't listen, and you feel like you're not being heard, and you keep screaming to hear me.

I fear that the time will come when each of us wishes for a society without the other.

If this condition persists, if this condition persists, blood may be spilled.

You can see signs of this bloodshed in the newspapers every day.

Maybe there will be roundups, crackdowns, deportations, incarceration, dissolution of the country, etc.

I don't mean to exaggerate

There are whispers that war will break out in places that should have already ended

But there's always hope of salvation

It's not a cheap and shallow salvation that says let's do our best together like nonsense

more effective

To do that, we must accept that we are here to be.

we create 'others'

As parents, as neighbors, as citizens, we recognize and sometimes ignore each other's existence.

People are not born with vengeance

When people hunger for revenge, I have a role And now that hunger invites me to make more elaborate escapes From our lives -- from school, from our neighbors, from airports, from amusement parks -- that's what we once shared.

Then not those vast, impersonal forces

let's focus on the issues that concern you and me

Let's choose the paths that connect us to each other that got us here

So that we can get out of here, let's choose a way to engage with each other

For that you have to let go of some things Fellow citizens, let's stop turning a blind eye to reality

Imagine - what if certain people stopped yearning for an exiled society?

What if I stop deliberating on how to save the world or what to do with the future without you?

Only when we admit that we've been ignoring each other until now will the work begin.

If there's any hope we can summon in these ominous times, it's this.

We've been chasing haze dreams for so long Turning a blind eye to what's important To each other's eyes To each other's big dreams To ask each other's questions To make history together

We should be able to work on each other's dreams as they are before the glitter catches our eye.

let's do it now

Sincerely, Fellow Citizen

(applause)

How can we build a society without using fossil fuels?

This is a complex challenge, and I believe developing countries can lead this transition.

I know many of you will disagree, but the reality is that if we continue to put fossil fuels at the center of our development, our nation will be at risk of far too much.

we can take a different approach

Now is the time to really do something about debunking the myth, which is the idea that there is only one choice between developing a country or protecting the environment, renewable energy, or quality of life.

I'm from Costa Rica, a developing country.

It's a country of about five million people, and it's right in the middle of the Americas, so it's easy to remember where we live.

Nearly 100 percent of our electricity is generated from renewable energy, five types of renewable energy.

(Applause) Hydro, geothermal Wind, solar, biomass power

Have you heard of it? Last year, for 299 days, all of our electricity was fossil-free.

It's a great feat, but it hides a contradiction: 70% of our energy consumption comes from oil.

why

It's because of our transportation system, which, like many other countries, relies entirely on fossil fuels.

If you compare the energy transition to a marathon, the question is how to cut the finish tape and how to decarbonize the rest of the economy.

If we can't make it work, who can -- who can make it?

And that's why I want to talk about Costa Rica, because I feel that we are the strong contenders, and we can pioneer the idea of ​​developing without fossil fuels.

Do you know one fact about Costa Rica? We don't have an army.

A look back at 1948

That year the civil war ended

Thousands of Costa Ricans died and many families were horribly separated.

But one astonishing idea caught people's attention, and it was that the Second Republic would not have an army when it restarted the country.

we abandoned the army

The then president, José Figueres, took a forceful approach and smashed down the walls of the army base.

The next year, 1949, we made that decision permanent with a new constitution, and that's why we can tell this story now, 70 years later.

I am grateful

I am grateful for that decision before I was born, because it allows me and millions of other people to live in a stable country.

Was it just luck? No, it's not luck.

Because there was a deliberate choice that served as an example.

Free education and medical services begin in the 1940s.

it was called social security

By abandoning the military, military spending turned into social security, which is the engine of stability.

In the '50s, (Applause), in the '50s, we started investing in hydropower, which was a way out of the trap of using fossil fuels to generate electricity, and now the world is fighting that trap.

In the '70s, we started investing in national parks, which allowed us to avoid the horribly wrong theory of wanting growth, growth, growth at any cost, which is a common theory in developing countries.

In the 90s, it pioneered investments in "ecosystem services," which help restore deforestation and promote ecotourism, which is key to growth.

So investing in environmental protection isn't hurting the economy.

the opposite

It's not that we're perfect, it's not that we're not free of contradictions.

that's not the point

The important thing is that the decisions we make have empowered us to overcome the challenges of development.

And our country's per capita GDP is -- depending on how you count -- about $11,000.

Compared to the value estimated from GDP, our country's social progress index shows a very different value.

The act of abandoning the military and investing in nature and people was very powerful.

It created a story. It's a story of a small country with big ideas, and growing up with that story has been very powerful.

The problem is the next big idea for our generation to think about.

The next thing we need to do is give up fossil fuels forever, just as our generation once gave up the military.

Fossil fuels cause climate change

We know that, we know that humans are vulnerable to the effects of climate change.

As a developing country, what we are most interested in is development that does not use fossil fuels that are harmful to humans.

Because why do we continue to import oil when we can use electricity for transportation?

Remember, our country gets its electricity from river water, from volcanic heat, from wind turbines, from solar panels, from biomass.

What ditching fossil fuels means is that we can do away with the existing transportation system and make cars, buses and trains run on electricity instead of the energy that pollutes the planet.

And more to the point, transportation is a real problem in Costa Rica, because the existing model just doesn't work.

It's hurting people, it's hurting companies, it's hurting our health.

This is happening every day because policies and transport infrastructure are failing.

It's being up two hours in the morning and two hours in the evening.

Why should this condition be accepted as normal?

It's a very infuriating problem to waste time like this day after day.

Compared to other countries where traffic is booming, our highways themselves are actually quite good.

Costa Ricans call traffic jams "presa."

means "imprisoned"

Everyone becomes violent.

this is what is happening

It's a problem for many people

The good news is that when we're talking about clean transportation and mobility, we're not talking about some distant utopia.

I'm talking about the emerging electric transportation.

By 2022, electric and conventional cars are expected to cost the same, and several cities are experimenting with electric buses.

These very cool vehicles keep costs down and pollute less.

If you want to get rid of the oil-dependent transportation system, you can do it, because now you have options that you didn't have before.

That's exciting

But, of course, there are people who will be offended by this idea, and they will say, "The world is stuck on oil, and so is Costa Rica. Look at the facts."

they say so

Do you know how to counter this?

1948 We didn't say, "The world can't give up its military, so let's keep our military."

We made a very brave choice that made a difference.

It's time for our generation to be brave, to give up fossil fuels forever.

I'll give you three reasons why you should do that.

First, our model of transportation and urbanization is broken. Now is the time to redefine our model of cities and transportation.

I don't need cities for cars

We need cities for people to walk and bike around.

We need public transportation, we need a lot of it, and it's clean and dignified.

As conventional cars continue to proliferate, our cities will become intolerable.

Second, we need change, but gradual change is not enough.

we need a drastic change

There are already some progressive projects in this country, and I was the first to admire their work, but --

stop cheating

We can't be satisfied with seeing a beautiful electric car or a few electric buses here and there. We can't continue to invest in the same infrastructure as the existing one, more cars, more roads, more oil.

We're talking about moving away from oil, which can't be reached by incremental reform.

Third, as I'm sure you all understand, the world is hungry for fresh ideas.

We're looking for success stories, especially stories about solving difficult problems in developing countries.

I believe Costa Rica will inspire other countries, such as by announcing last year that it had gone too long without using fossil fuels to generate electricity.

The news spread all over the world

I felt very proud of the Costa Rican woman Cristiana Figueres, who played a key role in the negotiations of the Paris Agreement on climate change.

We must protect the legacy of our predecessors and lead by example.

what's next

are people

How can people inherit this

How can we convince people that we can build a society without fossil fuels?

It requires a lot of hard work and effort

That's why we created "Costa Rica Limpia" in 2014.

"Limpia" means "clean," and we wanted to empower and inspire people.

Without public participation, decisions about a clean transportation system would be bogged down in an endless stream of technical debates and lobbying by various vested interests.

Becoming a green country with renewable energy is already part of our vision.

don't let anyone take it away

Last year, we brought people together from seven states to talk about the climate change issues that are relevant to them.

and surprisingly

The people there opposed almost everything, except renewable energy and clean transportation and air.

this united people

The key to getting people to really participate is not making them feel like they're insignificant.

People feel helpless People get tired when their opinions are ignored

We should be more specific, and by putting technical problems into the language of the people, we should show that the people have a role to play, and together we can play that role.

Now that the promises made for a clean transportation system are being tested for the first time, politicians know they must deliver. Especially in the developing world, the tipping point will come when everyone works together.

By the next election, all candidates will take their positions on fossil fuel abandonment.

Addressing this issue will be a major policy

I want to stress that this is not a policy debate on climate change, nor is it an environmental debate.

It's about the country we want to live in. It's about the city we live in. It's about the city we want to be in. It's about who makes that choice.

Ultimately, we have to show that renewable energy development is good for people, for Costa Ricans today, and especially for future generations.

This is the current national museum

It's bright and peaceful, and when you stand in front of it, it's hard to believe that it was used as an army barracks until the late 40's.

From this place began a new nation without an army, where, one day, the abandonment of fossil fuels will be declared.

and make history again

thank you

(applause)

everyone is having a hard time

(Laughter) Slowing economic growth is a very big problem.

Global economic growth has peaked

you already know

In fact, economic growth has been declining for the last 50 years.

At this rate, we will have to learn how to live in a world without growth for the next decade.

This is a scary thing, because if the economy stops growing, our children won't have a better life.

What's even more frightening is that if the global economy as a whole stops growing, everyone's share will be smaller.

we will fight for our share

This creates tension and serious conflict.

economic growth is very important

Let's look back at the history of growth, and the era of rapid growth has always been fueled by major manufacturing revolutions.

Three manufacturing revolutions happened every 50 to 60 years.

Mid-19th century steam engine popularized by Mr. Ford in the early 20th century - a mass-produced model

And in the 1970s came the first wave of automation.

Why did these manufacturing revolutions soar the world economy?

It's due to a dramatic increase in productivity.

It's simple: to grow, you have to produce more and put more things into the economy.

So you either need more labor, you need more capital, you need more productivity.

Productivity improvement was the key to growth on all three occasions

I want to tell you today that we are on the cusp of a new transformation, and this transformation, surprisingly, will also come from manufacturing.

This change is the one that will bring us out of the stagnant growth -- the globalization that has been shaped over the last decade -- and fundamentally change it.

I'm going to talk to you about this wonderful Fourth Industrial Revolution that's happening right now.

It's not that there hasn't been progress in manufacturing since the last revolution.

In fact, there have been attempts to revitalize manufacturing, but the results have been inadequate.

None of the attempts have yielded the real leverage needed to spur growth again.

For example, we moved factories overseas to take advantage of cost savings and cheap labor.

This attempt didn't lead to productivity gains, and it only held costs down for a short time, because workers' wages quickly went up.

And then they made the factory bigger and narrowed down the number of products they made.

The idea is to produce a single product in large quantities and store product inventory so that it can be sold on demand.

This method improved my productivity for a while.

But it also introduced rigidity into the supply chain.

For example, fashion retail

Traditional apparel companies have established global, inflexible supply chains overseas.

So when fast fashion like Zara moved its collection rotation cycle from twice a year to once a month, no company could keep up.

Many apparel companies are in a difficult situation right now.

Yes, it's the reality of today's manufacturing plants that have these kinds of defects.

When you open the lid, it looks the same as it did 50 years ago.

It's just that the location, the scale, the way it's run has changed.

I can't think of anything else that hasn't changed from 50 years ago.

It's no good

I've tried various ways to improve it, but I've hit a limit.

After failing to improve the manufacturing model, we thought growth would come from outside manufacturing.

High tech got the spotlight, and a lot of innovation happened.

For example, the Internet

expected to encourage growth

And as you know, the internet has changed our lives-

It made waves in the media, services and entertainment industry.

It didn't affect productivity much.

In fact, surprisingly, despite all the innovations, productivity is declining.

Imagine sitting at work, combing through Facebook, watching YouTube videos... all these things made us less productive.

it's funny

(Laughter) So we stopped growing.

While reforming the manufacturing industry failed, major innovations were taking place in other areas.

But what if you could combine the two?

What if the next big innovation in manufacturing is the combination of existing manufacturing and big innovation?

that's right!

This is the Fourth Industrial Revolution, and it's happening right now.

Key technologies are beginning to be fully integrated into manufacturing.

This improves industrial productivity by more than a third.

This overwhelming improvement will greatly contribute to economic growth.

Here are some examples

Have you seen the latest industrial robots?

It's the size of a human, and it can be programmed to work with humans on complex tasks that aren't repetitive.

Currently, only 8% of the work done in factories is automated.

And it's mostly repetitive work that isn't too complicated.

In 10 years it will rise to 25%

So by 2025, industrial robots joining the human workforce will increase overall productivity by 20 percent, which means that 20 percent more products will produce 20 percent additional growth.

This is not a fancy futuristic fairy tale.

Robots like this are already working

Last year, on Cyber ​​Monday in the United States, robots helped sort and ship all of Amazon's products, and it's time for online retail.

Last year in the United States, that day was the biggest transaction in online shopping history.

Electronics sales for the day are $3 billion.

this is real economic growth

3D printing technology was born

3D printing has not only improved the manufacturing process for plastics, but it's also beginning to make its way into metal products.

Both markets are by no means small

Plastics and metals make up 25% of the world's industrial production.

in the aerospace industry

I'll give you a real-life example. The fuel nozzle is one of the most complicated parts in a product, because it's made up of 20 different parts that are made separately and then painstakingly put together.

But 3D printing technology allows us to combine these 20 different parts into one.

as a result

40% more productivity, 40% more output means 40% more growth for the industry.

And in fact, this new manufacturing revolution does more than just productivity.

We can build better, smarter products.

So it's scale customization.

Imagine a world where you can buy a product that has the features you need and the design you want, for the same cost and time-to-manufacture as traditionally mass-produced goods: cars, clothes, mobile phones.

A new manufacturing revolution makes this possible

Modern robots can be programmed in many ways without increasing setup time or increasing functionality.

A 3D printer can instantly create any custom design.

It became possible to produce one-off products for individual use at the same cost and in the same time period as mass-produced products.

The examples I've just described are just a few of the manufacturing revolutions underway.

Not only will manufacturing become more productive, but it will also add flexibility that it didn't have before, and that's what's missing in its current growth.

In addition, manufacturing opens up new avenues in this way, creating additional opportunities.

A major macroeconomic shift will occur

First, the factories that had been relocated overseas will return to Japan.

In a world of scale customization, producing closer to the consumer is the new normal.

And factories get smaller and more mobile.

Flexibility will become more important than factory size.

Factories will be able to produce a wide variety of custom-made products.

this change is huge

Globalization enters a new era

East-West trade flows will replace intra-regional trade flows.

Locally made for locals

When you think about it this way, the old models start to look silly.

Products move around the world until they are stockpiled and delivered to the final consumer.

Newer models produce products closer to the consumer, which is cleaner and better for the planet.

In mature economies, domestic manufacturing creates jobs, boosts productivity and economic growth.

Isn't that a good story?

But the economy doesn't grow automatically.

Mature economies must also pursue growth

We have to retrain our workforce in a big way.

In many countries, including my home country of France, there is no future in manufacturing, something that is done far away.

I have taught my children

We need to turn this idea around 180 degrees and bring manufacturing education back to college.

Only countries that make such bold reforms will be able to grow in the future.

This revolution is also an opportunity for developing countries.

Soon, emerging economies like China will no longer be the "workshops of the world."

As emerging countries became wealthier, we knew that this model was not sustainable in the long term.

As of last year, the cost of producing in Brazil was the same as in France.

By 2018, manufacturing costs in China will be about the same as in the United States.

The New Manufacturing Revolution will accelerate the shift from a manufacturing model in emerging countries to a domestic consumption model.

It's a good trend, because this is how growth happens.

In the next five years, China's billion consumers of the future will fuel the global economy more than all of Europe's top five markets.

The Fourth Industrial Revolution is an opportunity for everyone.

If done in the right way, national economies will be able to grow continuously.

Then wealth will be distributed more evenly to all, and the future of our children will be brighter.

thank you

(applause)

I'm a palliative care doctor, and today I want to talk to you about medicine.

I want to talk to you about the health and care of the most vulnerable people in our country, the people with the most complex and serious health problems.

I also want to talk about the economic side of things.

These two intertwined would be very frightening, and very frightening to me.

I also want to talk about palliative care, which is about a framework of care that is rooted in people's values.

Patient-centered medicine is based on their values, helping people live better and longer.

This model of care is truth-telling, one-on-one engagement and tailored to the conditions in which they live.

I'm going to start with a story about my very first patient.

It was my first day as a doctor in a long white coat.

As soon as I arrived at the hospital, I met a 68-year-old man named Harold who was visiting the emergency room.

His headache lasted for six weeks, and it was getting worse day by day.

Tests showed that the cancer had spread to his brain.

My doctor instructed me to go to Harold and his family and give them their diagnosis, prognosis and care options.

Five hours into my new job, I did the few things I knew.

I walked into the room, sat down, took Harold's hand, took his wife's hand, and just breathed in.

"Isn't that good news, boy?" he said.

I replied "No good"

and we talked and listened and shared

After a while I said, "Harold, what does it mean to you?

what is important to you "and

he said "family"

"What do you want to do?" I asked

He tapped me on the knee and said, "I want to go fishing."

"Let's go then," I said.

Harold went fishing the next day

died a week later

I thought back to Harold during my clinical training.

I think there are just too few episodes like this.

It's a story that leads to a crisis, the biggest threat to the American way of life today, and that's health care costs.

So what do we know?

We know that sick people with the most serious diseases use 15% of the gross domestic product, about 234 trillion yen.

The 15% of the most severe diseases use 15% of the gross domestic product.

Over the next 20 years, this share is estimated to reach 60% of GDP as the baby boomers age.

That's 60% of the gross domestic product of the United States, and at that point it's not just health care.

This is related to a gallon of milk or college tuition.

It affects everything we value and everything we know now.

The free market economy and capitalism in the United States are at stake.

Now forget the statistics for a moment, forget the numbers.

Let's talk about the value we get for the money we spend.

About six years ago, the Dartmouth Atlas looked at all the costs Medicare spent on critically ill patients.

We found that patients with the highest per capita expenditures had the highest levels of distress, pain and depression.

And most of the time death is near.

How did this happen?

We live in the United States, and we have the best healthcare system on the planet.

We spend 10 times more on these patients than the world's second largest country.

it doesn't make sense

But what we do know is that we rank 37th among the top 50 countries in the world with organized health care systems.

Former Eastern Bloc countries and sub-Saharan African countries rank higher than us in terms of quality and value.

I go through it every day in the hospital, and I'm sure you've all gone through it in your life. More isn't always better.

So many tests, so many things, so many chemo and surgeries, so much everything, so much to do to a patient, it's going to reduce their quality of life.

Most of the time it shortens the lifespan.

So what should we do?

what are we doing

Why is this?

Ladies and gentlemen, the harsh reality is that the medical industry and doctors in white coats are robbing you.

It's robbing you of the opportunity to choose how you live your life, no matter what the disease.

We focus on individual specialties such as disease, pathology, surgery, and pharmacology.

we don't see the whole human being

How can we heal without understanding the whole human being?

We focus on our specialties, but we have to do it for the whole human being.

The three goals of medicine are: First, to improve the patient's daily experience.

Second, public health

Third, reduce per capita spending across the board.

In 2012, our palliative care group worked with the most critically ill patients: cancer, heart disease, lung disease, kidney disease, dementia. What did we do to improve their daily experience?

"Teacher, I want to go home."

"Let's do a house call then."

improved quality of life

think about people

Second, public health

How did we change the way we looked at our people so that we could engage them more deeply on a different level, and connect them to our human roots in a broader sense than ourselves?

In 2012, 94 percent of the outpatients we see no longer needed to go to the hospital. How did this happen?

It wasn't because I couldn't go to the hospital.

I didn't need to go to the hospital.

because we delivered medical care

preserved their values ​​and quality of life

Third is per capita spending.

For this group of patients, it's about $2.3 trillion right now, 60 percent of GDP in 20 years.

Patients get what they want in line with their values, live better and live longer, at one-third the cost.

Harold's life expectancy was limited, but palliative care has no time limit.

Palliative care is the framework from diagnosis to the end of life.

It lasts for hours, weeks, months, years, with or without treatment.

It's Christine

I have stage III cervical cancer, metastatic cancer that started in my cervix and has spread throughout my body.

she is alive in her 50s

This is about life, not the end of life

It's not just about old people, it's about everyone.

Richard

have terminal lung disease

"Richard, what's important?"

"Kids, Wife, Harley"

(laughs) "Good!

I can barely ride a bicycle, so I can't ride you on a Harley, but let's think about what we can do."

Richard was in bad shape when he came to me.

A little voice from heaven said he probably had weeks or months to live.

then we talked

Listening carefully can make a big difference

Use your ears as well as your mouth

"Make every day count," I said, as we say in every chapter of our lives.

I did an examination at the place where Richard spends his days.

It's just one or two calls a week, but I'm doing fine with my terminal lung disease.

Now palliative care isn't just for the elderly, it's not just for middle-aged people.

it's for everyone

this is my friend jonathan

It's an honor and a pleasure to have Jonathan and his father here today.

Jonathan is in his twenties, and we met a few years ago.

I had metastatic testicular cancer that had spread to my brain.

I had a stroke, had brain surgery, had radiation and chemotherapy.

It wasn't long after I met him and his family, and it was a few weeks before the bone marrow transplant.

With so much progress in treatment, you don't even know who you're dealing with

Why did you go this far without trying to make them understand who you are?

God can do anything

we are not gods

I hope you don't take it for granted

Today, palliative care is proven to help people live better and longer.

A groundbreaking paper was published in the New England Journal of Medicine in 2010.

It's a study done by a friend and colleague of mine at Harvard.

They divided terminally ill lung cancer patients into a group that received palliative care and a group that did not.

The palliative care group had less pain and less depression

less need for hospitalization

And folks, they lived three to six months longer.

If palliative care was a cancer drug, every oncologist on the planet would prescribe it.

Why not?

Again, we stupid doctors in long white coats are trained to treat narrow specialties and cast spells like that, not to treat the whole person.

Our deathbed is the place we will all end up someday

But today's story isn't about dying, it's about living.

How do we want to paint the pages of our lives, living according to our values ​​and what is important to us? That could be the final chapter, the last five chapters.

What we do know, what is proven, is that these conversations should be today, not next week, not next year.

It's our lives today, our lives when we're old, and the lives of our children and grandchildren that are at stake.

It's not just in the hospital room or on the couch at home, it's everywhere and you see it.

Palliative medicine is the answer, dealing with people and changing and improving the lives we all face.

To our colleagues, to our patients, to our governments, to all of us, let's stand together and speak up and demand the best possible care so we can have a better today and ensure a better tomorrow.

We need to change today so we can live tomorrow

thank you very much

(applause)

In July 1911, a 35-year-old Yale professor led a research team from a rainforest camp.

After climbing a steep hill and wiping the sweat from his forehead, he described the scene below.

What he saw, rising out of the dense rainforest thickets, was a wonderfully intertwined labyrinthine structure made of granite and beautifully interlocked.

The great thing about this project is that it was first funded by National Geographic and made the cover of National Geographic magazine in 1912.

This professor used state-of-the-art photographic equipment to photograph the ruins and completely changed the expeditions that followed.

The site was discovered and explored at Machu Picchu by Professor Hiram Bingham.

When he saw these ruins, he said, "This is an impossible dream.

What is this? "and

And today, 100 years later, this 37-year-old Yale professor takes you on an extraordinary journey.

(Cheers) What we're really trying to do is use state-of-the-art technology to survey an entire country.

It's a dream started by Professor Hiram Bingham, and we're going to take the stage all over the world, make archaeological research more open and inclusive, and do it on a scale never before possible.

That's why I'm so excited to tell you today that we're launching a platform with the TED Prize 2016 in Latin America, specifically in Peru.

(Applause) Thank you.

We're taking Professor Hiram Bingham's dream and transforming it into a great future that we can all share.

Peru has more than just Machu Picchu

We have some breathtaking jewelery that you can see here.

There is a unique Moche pottery in the shape of a person.

There are Nazca Lines and wonderful textiles.

As part of the TED Prize platform, we're partnering with some incredible organizations, starting with DigitalGlobe, the largest provider of commercial high-definition satellite imagery.

They have a great crowdsourcing platform to help us build.

It was used to search for the downed Malaysia Airlines Flight 370.

Of course, they also provide satellite imagery.

National Geographic supports education and research.

They also provide content for our platform, like the image archives you saw at the beginning, documentary footage.

The building and planning for this platform has already begun, and I'm already very excited.

here is the good part

Our team, led by Chase Childs, has already begun examining some of the satellite imagery.

What you are looking at is data with a resolution of 30 cm.

This is the Chan Chan archaeological site in northern Peru.

Dating back to 850 AD

It's an amazing city. Let's zoom in.

This kind of data and this level of resolution will be available for everyone to see.

You can see structures and buildings one by one.

Previously unknown ruins have already been discovered.

At this point, I can already say that as part of the platform, you will be able to contribute to the discovery of countless undiscovered sites, like this site and this much larger site.

Unfortunately, we're also starting to find evidence of large-scale looting, like this one.

So many sites in Peru are under threat, and the great thing about this platform is that all the data can be shared with archaeologists who are on the front line of research to help protect the sites.

I recently went to Peru and met with the Peruvian Minister of Culture and people from UNESCO.

we plan to work closely with them

Please note that the website is available in both English and Spanish because doing so is essential to ensure that Peruvians and other Latin Americans can participate.

Our core project co-principal investigator is this person, Dr. Luis Jaime Castillo, a professor at the Universidad Católica in Peru.

As a respected Peruvian archaeologist and former deputy minister, he will help us bridge the gap between archaeologists to collaborate and share data to enable archaeological research in the field.

And he's also running this amazing drone mapping project, and you can see the images in the background, this one, this one.

This data will be incorporated into the platform, and he will be photographing some of the new sites you discover.

One of our partners on the ground to help us with education, community outreach and heritage preservation is the Sustainable Conservation Initiative (SPI), an organization led by Dr. Larry Coben.

You may not realize it, but some of the world's poorest regions are next to some of the world's most famous monuments.

What SPI is doing is subsidizing these communities, especially women, through new commercial practices and practical education.

SPI teaches women how to make beautiful handicrafts to sell to tourists.

It empowers women to value and own their cultural heritage.

I had the privilege of spending time with 24 of these women at the famous Pachacamac ruins, just outside Lima.

The women here are amazing and motivated, and I'm sure SPI will improve the communities around the sites you're discovering.

Peru is just the beginning

As we plan to expand this platform globally, I have already received thousands of emails from academics, educators, students and other archaeologists around the world who are eager to participate and contribute.

In fact, we've already put forward some great candidate sites to help find them, and Atlantis is one of them.

I don't know if I'll find Atlantis, but I don't know what the future holds.

I can't help but look forward to the launch of the platform.

It will be officially launched by the end of this year.

Let me tell you, if my team's discoveries of the past few weeks are any indication, what the world will discover will be unimaginable.

Please be careful not to fall off the alpaca

thank you

(Applause) Thank you.

(applause)

At the heart of modern democratic life is a big question: how to fight terrorism without destroying democracy and without trampling on human rights.

After spending most of my career working with journalists, bloggers, activists, and human rights researchers around the world, I've come to the conclusion that if our democratic societies don't take the risk and commit to protecting and defending human rights, press freedom, and a free and open internet, extremist ideologies are very likely to flourish.

(Applause) That's it. Thank you.

no i'm kidding

(Laughter) I want to dig a little deeper into this story.

One of the countries at the forefront of this problem is Tunisia, the only country to have a successful democratic revolution during the Arab Spring.

Five years later, Tunisia is still plagued by serious terrorist attacks and widespread recruitment by ISIS.

Many of us are demanding that our government do whatever it takes to keep us safe.

Tunisian cartoonist Nadia Kaieri summed up the situation with a character saying, "I don't care about human rights.

I don't care about the revolution

I don't care about democracy or freedom

I just want safety."

The guard says, "Are you satisfied?"

"This should be safe."

If Tunisians find a way to solve terrorism other than going to prison, it will be a model not only for the region, but for all of us.

The reality is that civil society, journalists and activists are targeted by extremist groups and, in many countries, by their own governments.

We see bloggers and journalists imprisoned, prosecuted and intimidated by their own governments, many of which are allies of the West in the war on terrorism.

Let me give you just three examples

My former colleague and friend, Hisham Almirat, along with six Moroccan activists, have been charged with endangering national security.

Saudi Arabian blogger Raif Badawi was jailed and flogged for insulting Islam and criticizing the government in his blog.

Most recently, the Turkish representative of Reporters Without Borders, Errol Onderoglu, along with several other activists, was detained and charged with spreading terrorist propaganda for supporting the Kurdish media.

With counter-terrorism quickly turning into state repression, with no advocacy for minority groups or peaceful debate, the support of strong, independent local media is essential.

None of this has happened yet, but the U.S. government is working with Silicon Valley and Hollywood to spend millions and hundreds of millions of dollars to spread the "counter-message" -- propaganda.

To combat the terrorist propaganda that spreads online, Europe has set up Internet inquiry units to censor extremist content when people report it.

But the problem is that all this propaganda, surveillance and censorship has failed to do anything about it: the people who have the most credible voices and the ability to put forward compelling ideas and alternatives to the economic, social and political problems of the region that are the root causes of extremism are being silenced by their own governments.

All this ultimately leads to less freedom around the world.

In 2015, the human rights group Freedom House reported that freedoms were disappearing around the world for the tenth year in a row.

And they say it's not just because of the actions of the dictatorship.

Another reason is that even democratic governments are increasingly cracking down on dissidents, whistleblowers and investigative journalists.

UN Secretary-General Ban Ki-moon has warned that "the deterrence of extremism and respect for human rights go hand in hand."

This doesn't mean that governments shouldn't keep us safe, but I'm saying we need rule of law oversight and transparency and accountability.

Meanwhile, extremism is literally wiping out civil society in some countries.

More than a dozen secular bloggers and community activists have been murdered at the hands of extremists in Bangladesh since 2013, and the government has done little to prevent it.

In the Syrian city of Raqqa, Rukia Hassan, Naji Jelf and others were assassinated for reporting from ISIS-held territory.

The civil media organization Raqqa Silently Slaughtered uses strong encryption to transmit its stories and hide from eavesdropping and surveillance.

At the same time, democracies like the United States and the United Kingdom are trying to weaken or ban strong cryptography through legislation, because criminals also use cryptography.

We should win the right of citizens to use strong cryptography.

Otherwise, dissent and investigative reporting will become even more difficult in many more places.

But bad guys like criminals and terrorists find ways to communicate.

Let's celebrate the companies that stand up to give users the right to use cryptography.

But when it comes to censorship, the situation is much more complicated.

It's true that the prevalence of extremism on the Internet is a serious problem.

Facebook, YouTube, Twitter, and many other companies have announced the removal or suspension of hundreds of thousands of articles linked to extremist rhetoric.

But the problem is that the corporate regulatory structure is completely invisible from the outside, and there are people who get caught up in it.

For example, Iyad El-Baghdadi has been making fun of ISIS on Twitter.

He had his account suspended because he had the same last name as the leader of ISIS.

In December 2015, a woman by the name of Isis, which is also the name of an Egyptian goddess, was banned in large numbers.

This woman, a computer programmer living in the United States, tweeted that her Facebook account was suspended, and managed to get media attention and reactivate her account.

But that's the problem, because I needed attention.

Journalists are no exception

David Thomson, an expert on terrorism and a reporter for Radio France International, had his article removed from Facebook and his account was suspended for several days because the article contained a picture of the ISIS flag, which he did not intend to promote ISIS.

We also hear a lot of stories. This Egyptian man, Ahmed Abdullahi, recently reported on a discussion he had with extremists in Washington, D.C. Now he's arguing with ISIS supporters on social media, urging them to convert.

It's unclear whether Facebook or other companies know the extent of the collateral damage.

But journalism, direct activism, and public debate are being silenced by extremist voice-silencing efforts.

These companies have so much power over the public discourse that they should be held accountable.

Businesses should do impact assessments to identify and solve the problems we're seeing.

Companies should be more transparent about their takedown policies and have clear appeals and grievance mechanisms so that content can be reinstated.

Now, I've spent the last 10 minutes talking about how governments and corporations make things difficult.

This is a picture of members of the citizen media network Global Voices, which my friend Ethan Zuckerman and I co-founded more than a decade ago.

Interestingly, just after the Arab Spring, about five years ago, data scientist Gillard Rohtan created a network map of the Global Voices members who were most active on Twitter during the Arab Spring.

And many of them, during the revolutions in Tunisia and Egypt, stood between activists and journalists and played an important role as a point of contact.

What we need to do is make sure that these people are not only alive, but empowered.

Many of them are still active today, with the exception of those who have been sent to prison or forced into hiding or deported.

All over the world, people who are fed up with fear and oppression are connecting in their own communities and across borders.

We should do whatever we can to make governments and businesses better protect their rights.

And we should all be more aware of how our personal and political choices, our choices as consumers and businesses, affect these people around the world.

And it's clear that watching the news every day isn't enough.

We need to take personal responsibility by joining, or at least actively supporting, the movements of individuals and groups that are gaining power, as they fight for social justice, environmental sustainability, government transparency, human rights, press freedom, and a free and open internet around the world.

Ultimately, we will be able to overcome extremist networks and mass agitation and hatred through the power of digital.

but…

We must truly strengthen the global network of citizens around the world, supported by people who work hard every day, and let individuals take the risks for a more peaceful, open and free future.

thank you very much

(applause)

Let me show you 30 seconds from the best day of my life.

(Applause) This is El Capitan in Yosemite National Park. Just for the record, I'm climbing alone, without ropes, a method of climbing called free solo.

I've been dreaming of it for almost 10 years, and it's time to come true, and the footage is 750 meters above the ground.

Does it look scary? It's scary, sure, and that's why I've been dreaming of climbing free solo for so many years and never being able to.

But the day I shot this video, I didn't feel any fear at all.

It felt as comfortable and natural as walking around Yosemite that many people did that day.

What I'm going to talk to you about today is how I overcame my fear and felt comfortable.

I'll start by telling you briefly how I became a climber, and then I'll tell you about my two major free solo climbs.

Both were successful, which is why we're here now --

(Laughter) And while my first success left me with a lot of frustration, climbing El Capitan was one of the happiest moments of my life.

These two climbs will show you how I can tame fear.

I started climbing at the gym when I was 10 years old, which means that for over 20 years, climbing has been central to my life.

After nearly 10 years of climbing mostly indoors, I started climbing real rocks and gradually started free soloing.

Over a long period of time, I gained confidence and stepped up to bigger and harder obstacles.

There were many people who did free solos before me, and there was no shortage of goals.

By 2008, I had done most of the free solos in Yosemite, and I was thinking about trying to hit the unexplored wall.

My first thought was Half Dome, the distinctive 600-meter wall that rises from the eastern edge of Yosemite Valley.

The challenge and the attraction was that it was too big.

I had no idea how to prepare.

So I decided to stop preparing and go and try it in person.

I thought I was going to be strong in the race, but of course it wasn't the best strategy.

For the time being, two days ago, I climbed the same route with a friend, connecting each other with a rope, so that I could get a general idea of ​​what the place was like and to see if I could physically climb it.

But two days later, when I came back alone, I wanted to take another route.

I know there's a route around the hardest part about 100 meters

I suddenly decided to avoid the choke point and go there, on a route I had never climbed before—and my suspicions soon arose.

Imagine what it would be like to be alone and lost in the middle of a 2,000-foot cliff.

(Laughter) Luckily, that route wasn't wrong, and I was able to get back on track.

I was a little -- well, quite agitated, but I tried not to get upset, because I knew the hardest part was ahead.

I needed to calm down

It was a sunny September morning, and the higher I climbed, the more I heard the voices and laughter of the tourists at the summit.

People were coming up the normal trail on the other side, and they were going down there.

There were still flat granite walls up to the top.

It is a nearly 90-degree precipice with no cracks or protrusions that can be grasped, just small undulations on the surface.

I had to give my life to the friction between slippery granite and my climbing shoes.

We proceeded by carefully balancing and shifting the center of gravity.

Then I came to an uneasy foothold

I climbed on it two days ago, but then there was a rope.

Looking at it now, it looked so small and slippery.

I was wondering if my legs would get caught even if I put my weight on it

I thought about stretching my legs further, but it seems worse

I switched legs and tried to stretch my legs even more,

Feeling even worse

I started to panic

I heard people laughing from the top just above.

It doesn't matter where you are, I wanted to go to another place

many things crossed my mind

I knew what to do, but I was too scared to do it.

I just had to put my weight on my right foot.

After what seemed like an eternity, I accepted what I had to do, put my weight on my right foot, didn't slip, didn't die, and that one step marked the end of the hardest climb.

From there I made my way to the top

Armed with ropes and lots of climbing gear, when you climb the walls of Half Dome, tourists flock to take pictures in amazement.

At this time, I emerged half-naked, out of breath, and excited from the edge of the cliff.

no one thought anything

(Laughter) I looked like someone lost on a hike by a cliff.

Around me, there are people chatting on their phones and eating lunch.

I felt like I was in a shopping mall

(Laughter) I took off my tight climbing shoes and started to descend, and that's when people turned to me.

"Are you hiking barefoot? That's amazing!"

(Laughter) I didn't even bother to explain it. That night, in my climbing journal, I wrote about climbing Half Dome, but I added a picture of a frown and the words, "Can you do it better?"

I succeeded in this free solo and was honored as the first great achievement.

my friend did it for the movie

but i was dissatisfied

I just happened to get through it, and I wasn't satisfied with it.

I wanted to be a good climber, not a lucky climber.

I quit free soloing for the next year or so, because I didn't feel like I was climbing for luck.

But even when I wasn't free soloing, I started thinking about El Capitan.

It has always been in my mind as the ultimate free solo that everyone recognizes.

No other wall is as impressive

For the next seven years, I kept thinking, "This year, I'm going to climb El Capitan."

And then you go to Yosemite and you look up at that wall and you think, "I can't do this."

(Laughter) It's too big and scary.

But I finally decided to try El Capitan.

It was about finding a way, but I had to change the way I felt.

It's not good to say that I somehow managed to get through with luck.

I wanted to do it properly this time.

What makes El Capitan intimidating is the sheer size of its walls.

It takes most climbers three to five days to climb a 900-meter vertical granite wall.

It was inconceivable that I would start climbing a wall that big with just my shoes and a chalk bag.

There are thousands of limb movements to climb a 900-meter wall, and it's hard to remember.

I learn by repeating actions

I've climbed El Capitan about 50 times with a rope in the last 10 years.

This picture shows my favorite practice

I use a 300 meter rope to go down the wall from the top and practice all day by myself.

Once you find a procedure that seems safe and reproducible, you have to memorize it.

You have to take it to the point where it's ingrained in you and there's no chance of making a mistake.

I don't want to get lost. Everything should be automatic.

Climbing with a rope is largely a physical effort.

You just need to hold on tight and have the strength to climb.

But free soloing is a big part of the mental part.

It's no different in the physical part.

It's the same wall we climb

It takes a certain state of mind to stay calm and perform at your best, knowing that any mistake can mean death.

(Laughter) I shouldn't laugh, but maybe it's funny.

(Laughter) I cultivated that state of mind through visualization, imagining the whole process of climbing a wall alone.

It's partly to remember the cues, the footholds, but the main part of the visualization is to feel the texture of the cues and imagine what it feels like to stretch your legs and place your feet carefully.

It's like a dance choreography that's hundreds of meters above the ground.

The most difficult part of the route is called "Boulder Problem"

It's about a 2,000-foot climb, and it's the most difficult movement, with faint clues spaced apart and only small, slippery footholds.

A faint cue says this: the edge is pointing down, not nearly the width of a pencil, and you have to push it up with your thumb.

But the hardest part here is

There's a karate-like stretch of the left leg to the inside of the nearest corner, which requires a high degree of precision and flexibility in the movement, so I did nightly stretches for a year to make sure I could reach my leg with plenty of room.

As we practiced the movements, the visualization turned to the emotional part.

What if you climb up there and get scared?

What if I'm too exhausted?

What if that kick didn't go well?

I had to think of all the possibilities when I was on the safe ground, so that there would be no room for doubt when I was doing that move without the ropes in the real world.

Doubt is a precursor to fear, and I knew that if I was in fear, I would never experience the perfect moment.

I had to visualize and practice enough to clear my doubts.

And then we also visualized how it would feel if it seemed impossible.

What if, after all that effort, you don't have the courage to take on the challenge?

What if you were just wasting your time and didn't feel like putting yourself in that situation?

There's no easy answer, but the mountain was big enough to be worth the effort to find out.

Some preparations are boring

This is my friend, Conrad Anker, with an empty rucksack on his back, climbing to the bottom of El Capitan.

Together we climbed a crack in the middle of the wall, which was filled with loose rock and was difficult and dangerous.

So we carefully removed the rocks, packed them in our backpacks, rappelled down, and came down.

Imagine how silly it would feel to climb a wall 500 meters and just pack a backpack of rocks and go home.

(Laughter) It's hard to carry a backpack full of rocks.

It's even more so when you're on top of a precipice.

It was something I had to do, even if it seemed like an idiot.

Everything has to feel perfect to climb that route without a rope.

After two seasons of preparing for El Capitan's free solo, we're finally ready.

I knew all the clues and footholds on the route, and I knew exactly what to do.

i was ready to climb

It's time to try a free solo on El Capitan.

June 3, 2017 I woke up early, had my usual breakfast of muesli and fruit, and reached the base of the wall before sunrise.

I looked up at the wall and felt confident

When I started climbing, I felt more confident.

I climbed about 150 meters and came to a rock wall similar to what I had trouble with at Half Dome, but this time it was different.

Hundreds of meters of walls on both sides, considering every option

I knew exactly what to do

No doubts, just climbed

Even the toughest parts went through with ease.

I completed the steps I decided perfectly

We took a short break under the boulder problem, and then we roped it back and forth and climbed as we had practiced.

Without hesitation, I kicked my leg into the left wall and knew I had done it.

Winning Half Dome was a big goal, and I achieved it, but I didn't get what I really wanted.

I didn't investigate

I was hesitant, I was afraid, it just wasn't the experience I was hoping for.

El Capitan was different

With 200 meters to go, I felt like the mountains were giving me a winning lap.

I climbed with ease and precision, enjoying the sounds of birds flying over the cliffs.

everything felt like a blessing

After three hours and fifty-six minutes of incredible climbing, we reached the summit.

I had the feeling that I had mastered it in the way I wanted to climb.

Thank you. (Applause)

I had this nightmare: I was standing in the middle of a landmine-ridden wasteland.

In real life, I go hiking a lot, but every time I try to go hiking, I feel insecure.

In the back of my head, I'm thinking, I might lose a limb.

This deep-seated terror began 10 years ago when I met Mohammed, a cluster bomb survivor who was scarred during the conflict between Israel and Hezbollah in Lebanon in the summer of 2006.

Mohammed, like many other survivors around the world, had to live with the horrifying effects of cluster bombs in his daily life.

When the month-long hostilities began in Lebanon, I was still working at Agence France-Presse in Paris.

I remember watching the news, glued to the screen and feeling anxious.

I wanted to make sure that the bomb being dropped missed my parents' house.

When I was sent to Beirut to cover the war, I was relieved to be reunited with my family, who had managed to escape from southern Lebanon.

The day the war ended, I remember seeing this image of people fleeing on one of the blocked roads, rushing south to return home in whatever condition they were.

Approximately 4 million cluster submunitions are believed to have been dropped in Lebanon during the 34 days of hostilities.

Mohammed lost both legs in the last week of the fighting.

He lived a five-minute drive from my parents' house, so I was able to track him down over the years.

It's been nearly ten years now since we first met.

I've seen young boys endure physical and psychological trauma.

I've seen teenage boys tattoo their friends for a flat rate of $5.

I've seen young, unemployed guys spend hours on the Internet trying to find a girlfriend.

The fate and consequences of losing both legs are now part of his daily routine.

Bomb injury survivors like Mohammed have to deal with things we can't even imagine.

Can you imagine? Many of the daily tasks that we take for granted, like going to the beach or picking up things on the floor, cause stress and anxiety.

Ultimately, Mohamed was confined to a wheelchair because his prosthesis was inconvenient.

Ten years ago, I didn't really know what cluster bombs were or what their horrifying effects were.

I learned that this weapon of indiscriminate killing is being used in so many parts of the world, steadily taking lives, and making no distinction between military targets and children.

I asked a simple question, "But who would make a weapon like this?

And for what? ”

Let me explain what a cluster bomb is.

It's a big buckshot filled with submunitions.

When this is dropped in mid-air, the container pops open en route, releasing hundreds of submunitions.

It spreads over a wide area, and when it hits, many remain unexploded.

These unexploded ordnance, just like mines, lie on the ground waiting for their next target.

It can explode if someone accidentally steps on it or picks it up.

These weapons are very unpredictable, which makes them even more dangerous.

Even if one day the farmer was able to plow the land without any problems,

The next day, when you start a fire and try to burn the branches, the heat might set off a nearby bombshell.

The problem is that children mistake sub-bombs for toys because they look like bouncing balls or soda cans.

As a photojournalist, a few months after the end of the war, I decided to return to Lebanon to meet with cluster bomb survivors.

I met a few people - Hussein and Rasha, both of whom had lost their legs to sub-bombs.

Their story, like that of many other children around the world, spoke to the horror of the continued use of such weapons.

This photo was taken in January 2007 when I met Mohammed.

He was 11 years old, and I met him exactly four months after his accident.

When I first met him, he was undergoing painful physical therapy to heal from wounds that had not yet healed.

Still young and in shock, Mohamed struggled to get used to his new body.

He says he used to wake up at night to scratch his lost leg.

I was drawn to his story because I quickly realized the challenges Mohammed would face in the future, and at just 11 years old, I knew that the challenges he was facing as he adjusted to his injuries would be multiplied by many.

Even before he became disabled, Mohammed's life wasn't easy.

Born in the Rashidie camp of Palestinian refugees, he still lives here.

There are about 400,000 Palestinian refugees in Lebanon, and they suffer from a discriminatory legal system.

They can't work in the public sector, they can't have certain jobs, they don't have the right to own property.

That's one of the reasons why Mohammed didn't particularly regret having to leave school so soon after his injury.

He said, "There's no point in having a college degree because you can't get a job in the first place."

The use of cluster munitions has a vicious cycle of impacts on communities and not just in the lives of the victims.

Many people injured by this weapon end up out of school, out of work or even out of work, and unable to provide for their families.

Not to mention constant physical pain and isolation.

These weapons particularly affect the poorest people.

High medical bills are a burden on families.

They have to rely on humanitarian assistance, which is inadequate and unsustainable, especially when they need lifelong assistance.

Ten years after his injury, Mohammed still can't afford a decent prosthesis.

He walks very carefully because over the years he's embarrassed himself in front of his friends by turning a few turns.

He jokingly says he doesn't have legs, so one day he'll walk on his hands.

The worst effect of this weapon, yet invisible, is its lingering scars.

Mohammed's initial medical records have diagnosed him with symptoms of post-traumatic stress disorder (PTSD).

He suffers from anxiety, loss of appetite, sleep disturbances and anger.

The reality is that Mohammed has not received the support to fully recover.

He now wants to leave Lebanon at any cost, even if it means embarking on a perilous journey like refugees crossing the Mediterranean to Europe.

Knowing how dangerous such a journey would be, he says, "I don't care if I die on the way."

For Mohammed, it's as good as dead.

Cluster bombs are a global problem that will continue to ravage and plague communities for generations to come.

In an online interview with Jamie Franklin, head of the Minds Advisory Group, he said, "The US military has dropped more than two million tons of bombs in Laos.

When we couldn't find any targets in Vietnam, we had a place in Laos where we could unload our cargo, and we dropped it before we got back to base, because it would be dangerous to land with the bombs on board."

According to the International Committee of the Red Cross, between 9 and 27 million unexploded ordnance remains in Laos alone, one of the poorest countries in the world.

Since 1973, 11,000 people have been injured or killed.

This deadly weapon has been used in armed conflicts in over 35 countries and over 20 territories, including Ukraine, Iraq, Sudan, and others.

So far, 119 countries have joined an international agreement to ban cluster munitions, officially called the Convention Against Cluster Munitions.

But some of the major producers of cluster bombs -- namely the United States, Russia, and China -- have not signed up for this life-saving treaty and are continuing to produce them, and have reserved the right to continue producing them in the future, stockpiling this deadly weapon, and may even use it in the future.

Cluster bombs were most recently reported to have been used in the ongoing civil wars in Yemen and Syria.

Financial institutions are investing billions of dollars in companies that make cluster bombs, according to a survey by Pax, a Dutch NGO, about global investment in cluster bomb producers.

Many of these institutions are in countries that have not yet signed the Convention on Cluster Munitions.

Back to Mohammed, one of the few jobs he had was picking lemons.

When I asked him if it was safe to work in the fields, he said, "I don't know."

Studies show that cluster bombs often contaminate areas where agriculture is the main source of income.

According to Handicap International, 98% of the people injured and killed by cluster bombs are civilians.

84% of the injured are men

In countries where there is no choice but to work in these fields, people just take risks and go out into the fields.

Mohammed is the only male in a family with three sisters.

Culturally, he's supposed to provide for the family, but he can't.

He tried many jobs, but none of them were able to hold because of his disability and the environment was not very friendly to people with disabilities.

It hurts him a lot when he goes looking for a job and is shunned out of pity for a small sum of money.

He said, "I don't want you to give me money, I want you to work and make money."

Mohammed is now 21 years old

He's illiterate, so we communicate by voice message.

this is one of his messages

(Audio) Mohammed: (Speaking in Arabic) Bushnaq: He said, "My dream is to run. Once I start running, I never stop."

thank you

(applause)

Suppose you are a pig farmer

I live in a small pig farm in the Philippines

Livestock are the only source of income that supports your household, but only if they are healthy.

But at any given time, one pig may get swine flu.

If one pig, confined in a small block, coughs and has a runny nose, the pig next to it may soon cough and have a runny nose, spreading swine flu throughout the farm.

If it's a bad virus, it can quickly affect the health of the herd.

If you call a veterinarian, they'll come to your pig farm and take samples from the pig's nose and mouth.

But the samples have to be loaded into the car and brought back to the city for analysis at the central laboratory.

In two weeks, we'll hear the test results.

Two weeks is enough for an infection to spread and take away your life.

But there's also another way

Pig farmers can now take their own samples.

You can go right into the piggery and wipe the pig's nose and mouth with a little test strip, put this in a little test tube, mix it with chemicals, and you can extract the genetic material that was in the pig's nose and mouth.

Without leaving the pig farm, you can take a drop of genetic material, put it in an analyzer that's smaller than a shoe box, program it to detect the DNA or RNA of the swine flu virus, and in less than an hour, you'll have results that you can see.

Now, we're living in the age of personal DNA analysis technology, and this is really possible.

Anyone can actually test their own DNA.

DNA is the basic molecule that holds the genetic instructions that underpin the world of life.

also for humans

pigs have DNA too

Even bacteria and some viruses have DNA.

Your body develops — grows and functions — according to the genetic instructions encoded in your DNA.

And there are many examples of the same genetic code causing disease.

Genetic information is written along a long, twisted molecule called the DNA double helix, which contains more than 3 billion characters written end to end.

But the part where the meaningful information is written - it's usually very short, just a few dozen to a few thousand characters.

So when you're trying to answer a question based on your DNA, you don't have to literally go through all those three billion letters.

It's like when you're hungry in the middle of the night and you're flipping through the pages of your phone book from top to bottom, checking each line to find a pizza place.

(Laughter) Luckily, 30 years ago, humans figured out how to find specific parts of our genetic code.

It's a great DNA analyzer.

You can find any part of your DNA

But even if you do find it, it's a very small piece of DNA, surrounded by a lot of other DNA. So these machines replicate the genes they're interested in, and then stack them up, one after the other, by millions of copies, making them stand out from the rest of your DNA, allowing you to visualize, analyze, decipher, understand, answer: Does my pig have the flu?

Is there anything else suspicious about my DNA? What's your cancer risk?

Do you have Irish blood?

Is that child my child?

(Laughter) It sounds like a simple thing, but DNA replication has changed the world.

Scientists use this technology every day to detect and treat disease, create innovative medicines, create genetically modified foods, and assess whether food is safe or contaminated with deadly bacteria.

Judges can also use the results of these instruments' analyzes in court to decide whether defendants are innocent or guilty based on DNA evidence.

The inventor of this DNA replication technology won the Nobel Prize in Chemistry in 1993.

But for 30 years, the power of genetic analysis was confined to the ivory tower, the big-name scientists with PhDs.

Several companies around the world have tried to make the same technology available to pig farmers and you, everyone.

I co-founded one such company with others.

Three years ago, I decided with my research colleague and friend, the biologist Zeke Alvarez Saavedra, to create a personal DNA analyzer that anyone could use.

The goal was to make DNA science available to more people in new settings.

I started in the basement

It made me ask a simple question: what would the world be like if everyone could analyze their DNA?

We had the curiosity that you would have if you saw this picture in 1980.

(Laughter) You're probably thinking, "Wow.

Right now, I can call Aunt Glenda from the car and say 'Happy Birthday'.

You can call anyone anytime

This is the future."

Little did I know how it worked, and I tapped the screen of my phone to make dinner reservations with Aunt Glenda to celebrate my birthday.

Press the button again to order a gift

Tap one more time to like Auntie on Facebook.

I can do all this while sitting on the toilet seat.

(Laughter) Predicting how new technologies will change the future is a notoriously difficult problem.

The same is true of today's personal DNA analysis technology.

For example, I could never have imagined that one truffle farmer would use a personal DNA analyzer.

Dr. Paul Thomas grows truffles for a living.

In this picture, he's holding the first British truffles grown on his farm.

Truffles are delicate plants made from certain fungi that live in the roots of living trees.

A very rare mushroom

Depending on the species, it costs about 300,000 to 800,000 yen per kilogram.

What Paul told me is that truffle farmers are taking a very high risk.

When you get new truffles to grow on his farm, you run the risk of being caught with fakes.

But even with an eye as experienced as Paul's, even under a microscope, the verdict is that the truffle is real.

Paul relies on DNA analysis to grow the highest quality truffles that chefs around the world vie for.

Are you surprised?

When you see black truffle risotto, you probably think of genes.

(Laughter) But personal DNA analyzers can save lives.

Dr. Ian Goodfellow is a virologist at the University of Cambridge.

I visited Sierra Leone last year

When the Ebola epidemic hit West Africa, he realized that doctors didn't have the tools to detect and treat the disease.

It took a week for the test results to arrive, which was far too long for the sick patients and their families.

Ian decided to move his research facility to Makeni, Ciara Leone.

Here's a picture of Ian Goodfellow loading a piece of equipment that weighs over 10 tons into a modular tent that will allow him to detect, diagnose, and sequence the virus within 24 hours.

But there was a surprise: Ian's lab in England was able to sequence and diagnose Ebola, but the same equipment wouldn't work here.

We argued that the high temperature of 35 degrees and over 90 percent humidity was the culprit.

As an alternative, Ian used a personal DNA analyzer that was so small that it could be placed in front of an air conditioner to continue sequencing viruses and save lives.

This may be an extreme environment for DNA analysis, but let me take you to an even more extreme environment: outer space.

I'm going to talk about DNA analysis in space.

Astronauts live on the International Space Station, orbiting Earth at an altitude of 400 kilometers.

It's moving at about 28,000 kilometers per hour

Imagine seeing 15 sunrises and sunsets every day.

It's a life in which you're swimming in almost zero gravity.

Under these circumstances, the body can be in a slightly strange state.

One is that the immune system is suppressed, making astronauts more susceptible to infections.

Anna-Sofia Bogaraev, a 16-year-old girl and high school student from New York, suspected that changes in the DNA of astronauts might be responsible for suppressing the immune system, and for a scientific competition called "Genes In Space," she designed an experiment to test the hypothesis by aboard the International Space Station with a personal DNA analyzer.

This is Anna Sophia watching an experimental launch to the International Space Station from Cape Canaveral on April 8, 2016.

A cloud of smoke rocketed Anna-Sophia's experiment to the International Space Station, where three days later, astronaut Tim Peake put her experimental plan into action in microgravity.

Personal DNA analyzers are now on board the International Space Station and can monitor living conditions and help protect the lives of astronauts.

A DNA experiment designed by a 16-year-old to save an astronaut's life might seem like a rare example of a child prodigy.

But to me, it's a harbinger of something bigger: the technology of DNA analysis is finally within your reach.

A few years ago, armed with nothing but a computer, a college student created an app that is now building a social network with over a billion users.

So, are we moving to an era where every household has a personal DNA analyzer?

I know a family that actually lives like that.

For example, the Daniels family has a DNA lab in the basement of their home in the suburbs of Chicago.

Not a family of scientists with PhDs.

just a normal family

Just having fun and doing creative things and spending time together.

By day, Brian is on the board of a private equity firm.

Nights and weekends, DNA experiments explore the world of life with seven- and nine-year-olds.

Last time I visited, they were inspecting the homegrown produce they grew in their backyard.

They were testing tomatoes that they had just picked. They took the fresh skins, put them in test tubes, mixed them with chemicals to extract the DNA, and used a home DNA replicator to test the genetic characteristics of the tomatoes.

For the Daniels family, a personal DNA analyzer is like a 21st century chemistry suite.

I don't think most people are still diagnosing genetic conditions in the kitchen sink or doing paternity tests at home.

(Laughter) But we've certainly reached a point in human history where, for the first time in human history, anyone can actually do a DNA test in the kitchen.

You can copy-paste DNA, do analysis, and extract useful information from it.

Transformative events like this one happen every now and then. Powerful transformative technology, once reserved for ivory towers, is finally within the reach of everyone, from planters to school children.

Think about when the corded phone was freed from the wall, when the era of big computers ended, and when we could use computers in our homes and businesses.

It's hard to predict what ripples the personal DNA revolution will bring, but one thing is certain: the revolution is irreversible, and DNA analysis technology is already spreading faster than we could have imagined.

If you're also interested, please try to feel DNA up close as soon as possible.

Curiosity is in our DNA

(laughs) Thank you very much.

(applause)

As someone who's fascinated by the human body, I'm thrilled that our bodies are finally getting some attention.

For example, through preventative medicine, patient-centered care, and self-monitoring, we are now paying attention to everything we do every day.

All of these things promote a healthy relationship between us and our bodies.

All of these are focused on the healthy self, but lack general anatomy knowledge.

Many people don't know where their vital organs are located or what they do.

The reason is that human anatomy is difficult and takes time to learn.

Have you studied anatomy?

That's amazing, there are a lot of people in the medical field.

I, like you, spent a lot of time learning a lot of structures.

No student learns anatomy without visual aids.

After all, these medical diagrams spark an interest in anatomy, whether or not you remember all the structures.

When you look at these, it's almost like you're looking at your own manual.

But what if you're done with your studies?

These beautiful illustrations remain locked up in the pages of medical textbooks and in apps, only to be looked at when needed.

For the average person, medical diagrams can only be seen on the walls of doctor's offices.

Since the dawn of modern medicine, medical diagrams, or human anatomy, have existed primarily in the realm of medical education.

But something great happened here.

Artists have liberated anatomy from the medical world and pushed it into the public arena.

For the last nine years, I've been cataloging and sharing the rise of anatomical art from my perspective as a medical illustrator.

Before we look at how artists have made anatomy their own, it's important to understand the impact of art on anatomy so far.

Because anatomy is essentially a visual science, and the first anatomists to understand it lived during the Renaissance.

They enlisted the help of artists to publish their findings.

And this movement, not just for education, but for fun, has come to fruition as a bizarre anatomical illustration.

Anatomy has oscillated between science, art and culture for over 500 years.

The artist did these humorous anatomical strips of dissected corpses as if they were alive.

What would it be like to be in a modern textbook?

They made it look like it was dead, and even peeled off the skin.

Severed limbs were often represented as still lifes.

There are also illustrations featuring pop culture.

This rhino, named Clara, traveled all over Europe in the mid-1700s, when rhinos were still rare.

This illustration is like an advertisement using a modern celebrity.

Coloring has brought an amazing amount of depth and clarity to anatomy.

By the beginning of the 20th century, the perfect balance between science and art had finally been found with the advent of medical illustrators.

They created a universal representation of anatomy, neither alive nor dead, untouched by art culture.

And it's precisely this focus on accuracy that benefits medical education.

This is what you should learn today

But why has medical illustration captured our hearts, past and present?

I am naturally drawn to the beauty of the human body.

Medical illustration is still an art

Nothing evokes as many emotional reactions, from joy to disgust, as the human body.

And now, artists have armed themselves with that emotion to take anatomy out of the medical world and bring it to life in the most creative ways through art.

Fernando Vicente, a contemporary Spanish artist, is a great example.

He wrapped 19th-century illustrations of male anatomy with female sensuality.

The women in his paintings go beyond superficial anatomy to introduce a powerful femininity that has never been seen before in anatomical representation.

Artistic outbursts can also be found in the healing and healing of the human body.

This is an x-ray of a woman who broke her ankle while roller skating.

To commemorate her trauma, we commissioned Montreal-based architect Federico Carvajal to create a wire sculpture of her lower leg.

Please pay attention to the bright red screws enlarged by engraving.

This is the actual surgical screw used to secure the ankle.

You're reusing medical equipment for art.

I'm often asked how I choose which works to exhibit online and to feature in galleries.

For me, it's a balance between technique and concepts that transcend the boundaries of anatomy as a way of knowing yourself, and I was struck by the work of Michael Reedy.

His no-nonsense portraits are often overlaid with humor.

For example, look at this woman's face

You have a red bruise

Michael turned the skin's instability into the background of a moody, unruly cartoon monster.

Here's a mirror image that shows the full anatomy and makes it look like candy by making it glow.

In doing so, Michael plays down the common perceptions of anatomy that are deeply tied to sickness and death.

The next concept may sound trivial, but human anatomy is no longer limited to humans.

When you were a kid, did you ever wish your toys were alive?

Jason Freeney made that dream come true with his toy anatomy chart.

(Laughter) You might think I gave a sick side to an innocent childhood character, but Jason says of his anatomy charts, "Kids were never scared of my work."

Always wondering, overjoyed, and trying to touch

Fear of anatomy and internal organs is not natural.

This anatomical representation extends to political and social objects.

In Noah Scarlin's "Anatomy of War," you can see human guts in a handgun.

But if you take a closer look, you'll find that it doesn't have a brain.

You'll also notice something else: Noah carefully places his rectum in the gun's launcher.

And this artist that I've been following for years has been exciting people with dissections.

Danny Kwouk is a young artist who paints a character dissecting himself.

He breaks the rules of medical illustration and uses dramatic shading.

So it looks three-dimensional, which makes it great for painting directly onto the skin.

Danny makes it look like he's actually peeled off a person's skin.

This effect is cool and tattoo-like, and can easily be brought into medical illustration.

Danny now travels the world teaching anatomy through his body painting, but to his surprise, he's been left out of the medical illustration program.

But I'm doing fine

There are also artists who distill human anatomy from both the medical world and the art world, making it directly into the street.

London's SHOK-1 has turned a popular cultural icon into a giant X-ray.

His radiographs show how culture can have its own anatomy, and how culture can become part of a person's anatomy.

His work is spectacular, because it's very difficult to duplicate an X-ray image with your bare hands, let alone by spraying.

He's also a street artist with a degree in applied chemistry.

Austrian street artist Nykos takes "development drawing" to a new level, spray painting anatomical drawings of people and animals on walls around the world.

Influenced by cartoons and heavy metal, Nykos brings a youthful energy to anatomy, and I love it.

street artists believe art is public

This is the most disconnected from the medical world, and street anatomy is so fascinating.

Now, whether you find it beautiful, whether you find it creepy or morbid, or whether you admire it like I do, you can't take your eyes off it, and you'll face the perspective of anatomy.

Because of our close and mutable relationship, it provokes precisely these reactions.

All of the artists I've met today refer to medical illustrations for their art.

But for them, anatomy is not just something to memorize, it's the foundation for understanding the human body on a meaningful level -- whether it's cartoons, body painting, or street art -- in a way that's familiar to us.

Anatomy art has the power to leap out of the pages of medical textbooks, evoke public excitement, ignite passion in the medical community, and ultimately connect our inner selves with our bodies through art.

thank you

(applause)

It was five minutes before I gave a speech to a group of executives, a talk about being in public, about being in front of a camera.

I was what you would call an expert, because I was a life and business coach who was a news anchor for 20 years.

I happened to glance at my cell phone to check the time and realized I had missed a call from my ex-husband.

i still remember his voice

"Darieth what is it?

I got a phone call from a guy I didn't know, and he told me to go to a website and see a lot of naked pictures of you.

Your nakedness is exposed all over the site

who's doing this? ”

I couldn't think or breathe

Feeling terribly humiliated and deeply ashamed

I felt like the world was ending

But this was the beginning of many months of pain, depression, anger, confusion and silence.

My jealous, stalking ex-boyfriend, who wants to get his way, puts his plan into action. He created a website named after me and posted this.

and this too

He also posted a bunch of overexposed photos that he took while I was sleeping when we lived together in Jamaica.

I've been receiving these threatening emails for months.

You tried to make me look like a nasty slut

I was once threatened with death

I've even been told that I'll shoot you in the head and stab you in the chest because I said you wanted to end a controlling relationship.

I couldn't believe this was happening to me.

I didn't even know what this move was

You're familiar with the terms cyber harassment and cyberbullying.

It's called "revenge porn" in the media.

I call it "Digital DV"

When a dominant ex-partner is unable to accept being dumped and is unable to resort to physical violence, mainly due to a strained relationship, they resort to alternative means: cell phones and computers.

what's the weapon?

Posting photos, videos, sexual personal information and content online without consent.

think about it, we all use the internet

And the Internet is a really small world.

Whether you're showing off a photo of your child, starting or growing a business, or starting a relationship, you're taking in the world with every Facebook like.

What do you think I found?

It's a smaller world

1 in 25 women say they've been affected by revenge porn

That's 1 in 10 women under the age of 30.

This means that you, the audience, can be victims too.

Let me tell you something even more amazing

It means that there is no legal system that can properly protect victims and punish perpetrators.

There's only one bill on the table, the ENOUGH bill by Senator Kamala Harris.

A bill outlawing revenge porn

It will take years to pass Congress.

So what's the deal now?

It's just a misdemeanor law

Currently, only Washington, D.C. and 40 states have revenge porn laws.

Penalties vary, ranging from a $500 fine.

$500?

Are you kidding me?

women lose their jobs

Even though I'm suffering from strained relationships and a tarnished reputation

I suffer from illness and depression

Suicide rate is on the rise

After 11 months in court, 13 trips to court, and thousands of dollars in legal fees, women get only two things: protection from cyberstalkers and cyberbullying, called PFA (Psychological First Aid), and a judge's sentence to force third-party Internet companies to take down content.

It's an expensive, complicated and confusing process.

Worse, because of legal loopholes and jurisdictional issues, it could take months, during which months my nakedness would be in the public eye.

Do you know how I feel compelled to hope that somehow my nudity will be taken down while it's on display for the world to see?

Eventually, I ran into a private company and filed a DMCA request to shut down their website.

DMCA is the Digital Millennium Copyright Act.

This is the law that regulates digital materials and content.

Broadly speaking, the DMCA is meant to protect both copyright holders and consumers.

So people who take naked photos and share them should have the copyright in that photo and should be able to file a DMCA request to have the content removed.

But don't jump to conclusions, because you're dealing with a third-party internet company that doesn't comply and doesn't do anything about it.

And let me tell you, even if you're in a consensual relationship, just because you've taken a naked picture doesn't give you the right to share it, even if you don't mean to cause harm.

Coming back to my case, to make things even more complicated, he was stalking and harassing me from another country, which made it nearly impossible to get help here.

But wait a minute - isn't the Internet international?

Don't you think we need some kind of policy that will broadly protect us regardless of borders and restrictions?

I couldn't give up and kept fighting

So I voluntarily allowed the Department of Homeland Security and the Jamaican Embassy to infiltrate my cell phone and computer for a thorough forensic examination three times, and I kept all the evidence.

I endured seeing naked pictures by an all-male investigative team.

This was an additional, shameful and insulting ordeal.

but something happened

Jamaican authorities ended up arresting him.

You're being tried locally under the Malicious Communications Act, and if convicted you could face fines of tens of thousands of dollars and up to 10 years in prison.

What's more, I learned that my case was changing history, because it was the first international case of this new crime.

Justice was finally done

But I came up with this

no one should have to go through something like this

No one should be humiliated to this extent and have to go through so many trials.

Our cyber citizenship is at stake

We need clear and strong regulation here in America. We need to hold online companies accountable and responsive.

And what about victims who don't have the time, money, or means to fight? Those who are disempowered, hurt and labeled unfairly?

You can do two things: unleash the shame and stop the silence.

Shame is at the core of all this.

The fear of condemnation is a drag on those who are silenced by shame.

And the price is a loss of self-esteem.

The day I stopped being silent, I freed myself from shame

And I've freed myself from the fear of being criticized by the one person I thought I was most likely to be criticized for. This is my son.

I can get over it

And Mama, he picked the wrong person to bully you."

(Laughter) (Applause) That day, I decided to use my status as a news anchor and my story and my voice.

I started by asking myself a simple question: Who am I supposed to be now?

It was this question that changed my life and made me think of all the possibilities, even in the face of so many obstacles.

I own the story, tell the truth, and write a new chapter in my life.

Say "Fifty Shades of Silence"

It's a global social justice project that makes documentary films to give victims a voice and dignity.

If you or someone you know is a victim, know that to regain your power, you need to take care of yourself and love yourself.

We need to turn anger into action, turn pain into motivation, and turn frustration into a path to the next step in life.

It's a process, a journey of self-discovery, and it may include forgiveness.

But it certainly takes courage and confidence and faith.

I call it, "It's about finding courage in everyday life."

thank you

(applause)

We've got a technology that will have the biggest impact in the next two to three decades.

not social media

even with big data

not robotics

not even artificial intelligence

You might be surprised to hear that it's the technology that underlies digital currencies like Bitcoin.

This is called "blockchain"

It's not a very bright-sounding word, but I believe this will be the next Internet, and I see it as promising great benefits for all businesses, for society, and for each and every one of you.

For the last 20 years, we've had an internet of information.

When you send an email or a PowerPoint file, you're not sending the original, you're sending a copy.

this is a good thing

democratize information

But what if what you send is an asset? For example, if it's money, financial assets like stocks and bonds, loyalty points, intellectual property, music, artwork, election votes, carbon credits, it's not a good idea to send a copy.

When you say you want to send $100, and you don't have the money yet and you can't send it -- (Laughter) -- it's very important.

This is a problem familiar to cryptography experts as the "double-use problem."

Today, we rely on big intermediaries -- banks, governments, social media companies, credit card companies -- to maintain trust in the economy.

These intermediaries handle all aspects of business and transactions, from authentication and identity verification, to settlement, mediation, and record keeping.

Overall they do a good job

There is also a growing problem

First, it is centrally managed.

This means it can be hacked, and it's happening more and more, and JP Morgan, the US federal government, LinkedIn, The Home Depot, and others are all learning it the hard way.

And it's excluding billions of people from the global economy, people who don't have enough money to open bank accounts, for example.

it also slows things down

E-mail can reach anywhere in the world in seconds, but it takes days and weeks to move money across cities in the banking system.

It also demands a big cut, as much as 10-20% just for sending money abroad.

It also holds our data, and we can't monetize it or use it to better manage our lives.

It also compromises our privacy.

And the biggest problem is that it's asymmetrically reaping the benefits of the digital age: wealth is being created, but social inequality is growing.

What if there wasn't just an internet of information, but an internet of value? What if one giant, globally distributed ledger ran on millions of computers and could be used by anyone?

And what if every asset, from money to music, could be held, moved, traded, exchanged and managed without a powerful intermediary?

What if there was a medium for value?

In 2008, after the financial crisis, an unknown person or group conveniently named Satoshi Nakamoto developed and published the electronic currency protocol behind the cryptocurrency Bitcoin.

This cryptocurrency builds trust between people and allows them to transact, without the need for third parties.

This seemingly simple thing has become a blazing spark across the world, causing frenzy, fear and curiosity among people everywhere.

Don't get me wrong, bitcoin is an asset that goes up and down, which is of interest to speculators.

More broadly, it's cryptocurrency

Not a legal tender controlled by a state

that's the more interesting part

But the real tiger roll is

The underlying technology is blockchain.

For the first time in human history, people everywhere can trust each other and trade directly.

This trust was not created by some big organization, but by cooperation and cryptography and clever programming.

I call it the Trust Protocol, because trust is at the heart of this technology.

I'm sure you're wondering how it works

It makes sense

Every digital asset, from money to music, is stored not in some central location, but in a decentralized global ledger maintained by the highest levels of cryptography.

When a transaction is made, it's sent to millions of computers around the world.

There are people called "miners"

It's a miner who mines bitcoin, not a minor of minors

Miners have a huge amount of computational power, 10 to 100 times the size of Google as a whole.

miners do a lot of work

Every 10 minutes, which is like the heartbeat of the network, a block is created containing all the transactions in the previous 10 minutes.

Then miners try to solve a difficult problem.

They're competing. The first miner to find the answer and validate the block will be given an electronic currency, or in the case of the Bitcoin blockchain, Bitcoin.

And here's the crux of the matter: a block is connected to the previous block to create a chain of blocks.

Each one is time-stamped and acts like an electronic wax seal.

So if you were to hack a block and try to pay, say, two people the same amount of money, you would have to change not just that block, but the entire history of transactions on that blockchain, and you would have to do it not on one computer -- but on millions of computers using the best cryptography at the same time, all under the watchful eye of the world's most powerful computing resources.

it's not easy

This is infinitely more secure than any other computer system today.

That's how blockchain works

Bitcoin is just one of many blockchains.

The Ethereum blockchain was created by a 22-year-old Canadian named Vitalik Buterin.

It has a distinctive feature

One of them is the ability to create "smart contracts."

this is what it says

It's an enforceable contract. It's the contract itself that handles the enforcement, administration, fulfillment, payment, etc., based on what people have agreed to. It's like the contract has a bank account.

There are many projects underway on the Ethereum blockchain, from creating a replacement for the stock market to new models of democracy where politicians are responsible to their citizens.

(Applause) Let's look at financial services as an example to understand how big a change this is.

do you know what this is?

Rube Goldberg machine

It's an intricately constructed device to do something as simple as breaking an egg or closing a door.

This reminds me of the financial services industry, frankly.

When you use your card at a corner store, your digital information goes through dozens of companies, each with their own information systems, some of them using mainframes from the '70s, before most of the people here were even born, and three days later, the transaction is finally completed.

If the financial industry uses blockchain, there is no need for settlements. Payments and settlements are the same act, just one change on the ledger.

So Wall Street and the world's financial industry are in a frenzy over this, wondering if they're going to get kicked out or how they can use this technology for their own success.

Why should I care?

Let's look at some application examples

prosperity —

In the early days of the internet, the internet of information created wealth, but unshared prosperity and widening social inequality.

This is at the core of many of the problems: anger, extremism, protectionism, xenophobia, and many other things we see in the world today, and Brexit is a recent example.

Could we come up with a new solution to this inequality problem?

The only solution today is to redistribute wealth by taxing it and distributing it widely.

Is it not possible to distribute wealth in advance?

Could we change the very way wealth is generated? Can't we democratize wealth generation, get more people involved in the economy, and make sure they get their fair share?

Let me tell you five ways you can do that.

Number one, did you know that 70% of the world's landowners have poor rights?

Even if you own a small farm in Honduras, a dictator who has seized power may say, "I know you have papers that say you own the land, but the government computer tells us that our friend owns your land."

In Honduras, that's happening on a massive scale, and the same problem is everywhere.

The great Latin American economist Hernando de Soto said, "In terms of economic liquidity, this is the biggest problem in the world, and it's more important than having a bank account, because if you don't have a legitimate claim to your land, you can't borrow against it, and you can't plan for the future."

Now there are companies that are working with governments to put land titles on the blockchain.

If you can do that, you can't tamper with it.

cannot be hacked

This will create conditions in which billions of people can thrive.

Second, many writers are talking about the sharing economy, like Uber, Airbnb, TaskRabbit, Lyft.

The idea of ​​equal individuals creating and sharing wealth together is a very powerful idea.

let me tell you

Those companies aren't really sharing.

In fact, it's precisely by not sharing that these companies succeed.

They aggregate people's services and sell them.

What if instead of Airbnb, a $25 billion company, there was a decentralized application on a blockchain -- let's call it B-Airbnb -- and that blockchain was shared with everyone who had a room to rent?

And when someone wants to rent a room, the blockchain database can be filtered by various criteria to find the right room, and the contract, the identification of the parties involved, and the payment processing can be done through an electronic payment system built into the system.

Reputation can also be handled with it. Once a guest rates a room five stars, the room and the rating are recorded there and cannot be tampered with.

So Silicon Valley companies that innovate in the sharing economy may also be weeded out, which is good for people's prosperity.

Third, the biggest flow of money from the developed world to the developing world isn't business investment, it's not foreign aid.

It's actually a remittance

There's a global diaspora, people leaving their ancestral lands sending money back to their families.

It's $600 billion a year, and it's growing, and they're being exploited.

Anale Domingo is a housekeeper

She lives in Toronto, and every month she takes money and goes to Western Union to send money to her mother in Manila.

They take a 10% fee.It takes 4-7 days for the money to arrive.My mother doesn't know when it will arrive.

She's wasting five hours on this.

Six months ago, Anale Domingo used a blockchain application called Abra to

I sent $300 from my cell phone.

It's delivered directly to the mother's cell phone, without any middleman.

When the mother opens that Uber-like app on her phone, she sees Abra's "teller" on the move.

She clicks on a five-star cashier seven minutes from her house.

The man comes to the door and hands her the Philippine peso and she puts it in her purse.

All of this takes minutes and costs only 2%.

There is great opportunity for prosperity here.

Fourth, the most powerful asset in the digital age is data.

Data is a whole new kind of asset, and it may be bigger than the previous kinds of assets, like land in an agricultural economy, or a factory or money in an industrial economy.

And we're all creating the data.

As we go through life, we create this data asset and leave behind digital breadcrumbs.

And then those crumbs come together to create a mirror image of the person, the virtual self.

Your "virtual self" may know you better than you do, because you don't remember what you bought a year ago, what you said, or exactly where you were.

And it's not you who owns this "virtual self," but that's the big problem.

There are companies that are currently working on creating black-box identities, where it's you who owns your "virtual self."

This black box follows me all the time and is extremely tight-lipped.

Passes only the minimum amount of information necessary to do something

In many commercial transactions, the seller doesn't need to know the other party.

All you have to do is know that the money will be paid

This avatar collects all the data and can monetize it himself.

This is great, and it also protects privacy, which is the cornerstone of a free society.

Let's put this asset of our own creation under our control so that we own our own identity and manage it responsibly.

And finally -- (applause) number five, a lot of content creators aren't getting their fair compensation because the intellectual property system is flawed.

Ever since the internet came out, it's been broken.

music for example

Musicians at the bottom of the food chain are left with nothing but breadcrumbs.

Twenty-five years ago, a songwriter wrote a hit song, and if he sold a million singles, he made about $45,000 in royalties.

If a songwriter today wrote a hit song that was streamed a million times, instead of $45,000, it would cost $36 to buy a pizza.

Grammy-winning singer-songwriter Imogen Heap is now putting her songs on the blockchain.

She calls it Mycelia

The song is that smart contract

Her intellectual property rights are being protected.

do you want to hear her song

Then pay it for free or a few microcents into your digital account.

If you want to use that song in a movie, it's a different story, and all the terms and conditions are laid down.

If you want to make ringtones, that's another story.

A song is a business, she writes

It's on this platform that you do your own marketing, you protect your authors' rights, and because your songs have a payment system like a bank account, all the money goes to the artists themselves, giving them control over the music industry, rather than powerful middlemen.

This is -- (Applause) This isn't just for songwriters, it's for all content creators, whether it's art, inventions, scientific discoveries, journalists.

There's a wide variety of people who don't get their fair reward, and blockchain will help them get paid.

this is good

I've shown you five of dozens of ways to solve the problem of prosperity, but there are countless other problems that blockchain can solve.

It's people, not technology, that create prosperity.

But what I'm trying to say is that the tech genie has once again escaped the pot. Summoned by an unknown person at some unknown point in human history, this genie is giving us new opportunities to rewrite the economic grid and the old order to solve some of the world's toughest problems, if we so desire.

Thank you very much

(applause)

There are words that we often say when we meet a stranger's eyes, or when we run into our neighbors.

"Hello Kakaga, I'm in a good mood"

"It's a nice weather, isn't it?"

"How are you doing?"

It seems pointless, but it's true

not really a meaningful question

I don't really want to hear about your mood or the weather.

It has another role

it's social

These words mean, "I acknowledge your existence."

I really like talking to people I don't know

Make eye contact, say hello, offer help, listen

I hear a lot of stories like that

About seven years ago, I started documenting my experiences to try to understand why.

I found that there, almost poetically,

that something wonderful is happening

It's a really deep experience.

there is unexpected joy

It's not a pretense, there's an emotional connection

There are moments when the heart is set free

One day, I was on a street corner waiting for a traffic light to change, and as a New Yorker, I stepped out into the driveway and waited in the pouring rain, as if to cross the road as fast as I could.

An elderly man was standing next to me

He was wearing a long coat and an old-fashioned hat, and he looked like something out of a movie.

He said to me, "Don't stand there, you'll disappear."

it was silly

I did as I was told, and took a step back onto the pavement.

And the person smiled and said, "That's fine, you never know what's going to happen.

If I turned around, it might have disappeared in a flash."

It's weird, but it was also great.

He was a very warm person and seemed happy that he saved me.

There is a bond between us

For a moment, it felt like my human being was recognized, that I deserved to be saved.

It's sad, but in many parts of the world, children grow up being taught that strangers are dangerous.

But most strangers aren't dangerous.

I feel uneasy because I don't know the person's background

because I don't know what you mean

So instead of using your senses to make judgments, you get away with categorizing people as "strangers."

I have a four year old daughter

When I greet people in the street, they ask me why

"Do you know anyone?"

"Uh-huh, it's a neighbor."

"Are you friends?"

"No, but I want to be friendly."

I think very carefully when I say that. I really do, but I know, as a woman, that not everyone you meet on the street has good intentions.

Not only should you be friendly, but you should know when you should be, but you shouldn't be afraid.

Using your senses instead of fear has two big advantages.

First, that it sets us free

Using your senses instead of categorization is easier said than done.

Classification is what the brain does naturally.

When it comes to people, it saves us the trouble of getting to know them.

Male or female, young or old, black, white or brown, stranger or friend, and the container.

It's quick and easy, but it leads to prejudice.

And this means that we don't see people as individuals.

I know an American female researcher who often travels alone in Central Asia and Africa.

She walks into town as a total stranger

No connections, no acquaintances

I am a foreigner

Here's how she survives: Find someone to see her as a person.

Then other people will see it the same way.

Another benefit of using your senses is intimacy.

Intimacy with a stranger may sound counterintuitive, but this brief interaction can create what sociologists call "fleeting intimacy."

It's a momentary experience with deep empathy and meaning.

Being rescued by an old man from a death trap in a downpour brought a warm feeling to me. Talking to someone on the commuter train made me feel part of the community.

it can be more than that

Studies have shown that we can be more honest and open about our true feelings with strangers than with friends and family.

The media treats this like a deplorable thing.

"It's a complete stranger rather than a spouse!"

makes sensational headlines

I think this misses the point

The implication of this kind of research is how great our relationships with others can be, and that this particular form of intimacy gives us just as much as we need with our friends and family.

How is it possible to communicate with others?

there are two factors

First, it has no consequences

that it is a temporary exchange

It's easy to be honest with someone you'll never see again.

it makes sense

Another factor is more interesting

We have expectations of those close to us

I hope you understand

I rely on others to read my mind

You go to a party and want to leave early, but you can't believe it when your friends and spouse don't notice.

"You properly signaled with your eyes!" "You properly signaled with your eyes!"

Start from scratch for others

Be open-minded about who you are and how you feel about them.

Therefore, other people

It happens that they understand me properly.

of talking to strangers

I understand the meaning, but what should I do?

There are unspoken rules that everyone follows.

The rules vary greatly from country to country and culture to culture.

In many parts of America, one of the public expectations is to maintain a balance between courtesy and privacy.

This is known as "ceremonial indifference."

Suppose two people are approaching in the street.

We look at each other while we're still a short distance apart.

This is a formal recognition of the other party.

Then when they get closer, they look away and keep their distance from each other.

Other cultures go to great lengths not to interfere with each other.

I've heard from Danes that they hate talking to complete strangers and would rather miss the bus than say "excuse me" and let them get out of the way.

Rather than just saying a word, it shows that you want to switch bags or put your body in to get through.

They say it's rude to ignore others in Egypt, and they have a distinct culture of hospitality.

Offer a sip of water to a complete stranger

It's normal to ask someone for directions and they'll invite you to take a break at home.

Those unspoken rules become apparent when they're broken, or when a newcomer to the land tries to figure out what's right for them to behave.

Something happens when you break the rules a little

When in doubt, I suggest you give it a try.

let me tell you how

find someone to meet

this will be a good sign

just smile at first

When we meet on the street or in the corridors here

Show me a smile and see the reaction

the other is trigonometry

With me and a stranger, there's something you two can talk about, a third thing -- some piece of art, someone giving a speech in the street, someone dressed weird.

try it

Say something about your thoughts and see if it leads to a conversation

There is also what I call attention.

usually use some kind of compliment

As for me, I like to focus on the other person's shoes.

The shoes I'm wearing right now aren't nice, but shoes in general are nice.

and there is no harm

Everyone has something to say about their nice pair of shoes.

You may have noticed the power of dogs and babies.

Talking to strangers on the street can be intimidating because you never know how they'll react.

But you can talk about dogs and babies.

Dogs and babies are social conduits that connect with each other, and their reactions tell us if they want to talk more.

The last thing I want you to try is Confidentiality.

It's about being vulnerable, but it's also highly rewarding.

Next time you're talking to someone you don't know and it feels good, try telling them something very personal about yourself.

You might get that feeling of being understood that I was talking about earlier.

During conversations, people sometimes ask me, "What does your father do?" or "Where does your father live?"

At those times, I tell the whole truth, that my father died when I was little.

And the other person will always tell you about someone they lost.

Even if you don't know each other, you respond to a confidence with a confidence.

That's why —

When you talk to a stranger, you can create a wonderful respite in the unchanging story of everyday life.

Create unexpected connections

If you don't talk to strangers at all, you'll never meet them.

We spend a lot of time teaching our children about strangers.

What would happen if we spent more time teaching ourselves about strangers?

We can let go of thoughts that make us look at each other with suspicion.

You can even create a space that creates change.

Thank you very much

(applause)

Concrete is the most popular construction material in the world.

It is used in the roads that run through the city, the bridges over the big rivers, and the tallest skyscrapers in the world.

But even such a tough material has a downside: it's prone to catastrophic cracks, costing tens of billions of dollars each year to repair.

But what if we could get around this problem by developing a self-healing concrete?

It seems like a wild idea, but it's not.

It all boils down to understanding how concrete forms and how we can use this formation process to solve problems.

Concrete is a mixture of gravel and sand particles called aggregate, mixed with cement, a powdered mixture of clay and limestone.

When water is added to this mixture, the cement becomes a paste that coats the surface of the aggregate and hardens quickly through a chemical reaction called hydration.

In the end, the finished concrete will be strong enough to support buildings that stand hundreds of meters high. Strong enough to support buildings that stand hundreds of meters high.

For over 4,000 years, people have used many different methods to make cement, but concrete itself has a surprisingly short lifespan.

After 20 to 30 years, concrete shrinkage, natural processes such as excessive freezing and thawing, and loads cause cracks to form.

And I'd say that not only large breakages, but also small cracks are just as dangerous.

Concrete is often used as a secondary support around rebar.

Even a small crack in this kind of concrete can allow water, oxygen, and carbon dioxide to seep in, corrode the rebar, and lead to catastrophic collapse.

Detecting these problems before they cause catastrophe in structures like bridges and highways that are in constant use is a large and expensive task.

But if we don't do the work, we're also putting thousands of lives at risk.

Fortunately, experiments with self-healing materials have already begun.

Part of the solution is inspired by concrete's natural healing mechanisms.

When water enters the tiny cracks, it hydrates the calcium oxide in the concrete.

The resulting calcium hydroxide reacts with carbon dioxide in the air and begins a process called self-healing, where microscopic calcium carbonate crystals form and gradually fill the cracks.

Unfortunately, this crystal can only repair cracks less than 0.3 millimeters wide.

Materials scientists have found a way to repair cracks that are twice as large by embedding glue in concrete.

What this means is that when you insert the glued fibers and tubes into the mix, when cracks occur, they snap open, releasing their sticky contents and closing the crack.

But the nature of the sticky chemical is quite different from concrete, and over time, the adhesive can also exacerbate cracks.

Perhaps the best way to fill large cracks is to give concrete the means to heal itself.

What scientists have discovered is that some bacteria and fungi can produce minerals, including calcium carbonate, which is found in self-healing.

Experimental concrete mixes contain these bacteria and fungal spores along with nutrients that can remain dormant for hundreds of years.

Eventually, when cracks form and water begins to wet the concrete, the spores germinate, grow, and absorb nutrients from their surroundings, altering the local environment to create optimal conditions for calcium carbonate growth.

These crystals gradually fill in the cracks, and after about three weeks, active microbes fully repair cracks up to a millimeter wide.

When the crack closes, the bacteria and fungi create spores and go into dormancy once again, ready to begin a new cycle of self-healing, ready for another crack.

While this technology has been extensively researched, we still have a long way to go to make it a reality in the global production of concrete.

But these spores have tremendous potential to give concrete greater resilience and durability, and significantly reduce the financial and environmental costs of concrete production.

Ultimately, these microbes may make us rethink the way we think about our cities by breathing life into an inanimate, concrete-filled world.

The general narrative in the world today is that it's a scary, downward time.

It's no surprise, if you look at the dark headlines of the world, there's ISIS, inequality, political dysfunction, global warming, Brexit, and more.

But let me tell you, it may seem strange

I don't believe in such grim news, and I don't think we should.

I'm not unaware of the problem

I watch the news like everyone else

What I want to counter is the conclusion that many people base their news on, that the world is ending, that the problems are insoluble and that governments are incompetent.

why are you talking like this

It's not because I'm a die-hard optimist or anything like that.

But I've always been frustrated by the media's constant fear-mongering and fixation on the problem rather than the solution.

That's what made me decide a few years ago that I'm a journalist, and I should try and see if I can do something, and I'm going to travel around the world doing interviews and seeing how people are addressing serious economic and political issues.

I was surprised to see the results

I saw wonderful signs of progress all over the world, in places I never expected, and it convinced me that some of the most serious global challenges might not be insoluble after all.

It's not just a theory on paper, it's a solution in action.

none of them solve the problem

The rest of us can also hope

I'm going to tell you how three countries I visited -- Canada, Indonesia and Mexico -- solved seemingly insoluble problems.

These examples are important because they contain methods that anyone can use, and they can be applied not only to specific problems, but to other problems as well.

What you think about my home country, which is now Canada, is -- if you can think about it, it's cold and boring and polite.

Saying "Excuse me" with a strange accent

that's all

(laughs) Excuse me.

(Laughter) But Canada is important. The problem that Canada solved is currently troubling many countries: immigration.

Canada is currently the most immigration-friendly country in the world, even more so than any other immigration-friendly country.

The proportion of immigrants per capita is four times that of France, and the proportion of foreign-born residents is twice that of Sweden.

Meanwhile, Canada accepted more than 10 times as many Syrian refugees as the United States last year.

(Applause) We're accepting more refugees now than we did last year.

If you ask Canadians what they are most proud of, the number one answer is "multiculturalism", which is a taboo word in almost every country, but the number two answer is "good hockey."

it's hockey

(Laughter) So, at a time when other countries are desperately trying to build walls to keep immigration at bay, Canada wants more immigration.

Here's where it gets really interesting

Canada hasn't always been like this.

Until the mid-'60s, immigration policy was very racist.

It was called "White Canada." You know, I'm not talking about snow.

How did Canada become what it is today?

Contrary to what my mother in Ontario thinks, the answer has nothing to do with virtue.

It's not like Canadians are born smart.

The real reason has to do with the man who became prime minister in 1968, Pierre Trudeau, who is also the father of the current prime minister.

(Applause) Trudeau, my father, was a very different person than any previous prime minister.

He was a French-speaking person in a country ruled by the English-speaking elite.

Trudeau was an intellectual

And it was kind of cool

it's true i practice yoga

was a friend of the Beatles

(Laughter) I think some people frowned because I was on the cutting edge of fashion.

On the one hand, this prime minister has achieved progressive reforms that no other country has.

When I looked into it, it turned out to be a two-step process.

First, we've done away with traditional immigration laws that are racist, replacing them with immigration laws that don't limit immigration based on skin color, but rather on education level, experience, and language ability.

New immigration laws make it more likely that new citizens will contribute to economic growth.

Trudeau then sanctioned the world's first policy of multiculturalism, promoting national unity and promoting the idea that diversity is at the heart of what makes Canada unique.

Since then, the government has been sending out this message, and at the same time, ordinary Canadians have become familiar with the economic and material benefits of multiculturalism.

These two changes combined to create the very open Canada that we have today.

The next thing we want to look at is another country's more troubling problem: Islamic fundamentalism.

In 1998, Indonesians took to the streets to overthrow Suharto's long-running dictatorship.

It was a wonderful event, but it was also terrifying.

Indonesia is the world's largest Muslim-majority nation, with a population of 250 million people.

The country is hot, large and sprawling, made up of 17,000 islands and nearly 1,000 languages ​​spoken.

Suharto was a longtime dictator and a bad leader.

But as a dictator, he was pretty good, and he always kept the separation of church and state in mind.

So the experts feared that without Suharto's repression, the country would either fall into chaos or be conquered by extremist religious groups, turning it into a tropical Iran.

that was my initial concern

The first free vote was held in 1999, when Muslim parties won 36 percent of the vote, plunging the country into chaos and killing thousands in riots and terrorism.

But since then, things have changed astonishingly.

On a personal level, people are becoming more religious in Islam. There are more women in the hijab these days, probably more than 10 years ago.

It is now a splendid democracy.

Meanwhile, Muslim-affiliated parties are slowly losing support, reaching a peak of about 38 percent in 2004 and dropping to 25 percent in 2014.

Terrorism is now rare

There are a few Indonesians who have recently joined ISIS, but they're very small numbers, much smaller per million people than Belgium.

This is unusual for a predominantly Muslim country.

In 2014, I went to Indonesia and interviewed the current president, the soft-spoken Joko Widodo, who comes from a tech background.

Widodo told me, "In order to confront fundamentalism, we first had to eliminate inequality."

Religious political parties in Indonesia, like their counterparts in other countries, have focused on fighting poverty and corruption.

Widodo and his predecessors did the same, copying the promises of Islamic parties.

They cracked down on terrorism, but Indonesian Democrats learned an important lesson from the dark days of the dictatorship: the more you suppress, the more extremism spreads.

So we went into the fight against terrorism with great care.

The police were dispatched, not the military.

Detain suspects only if there is sufficient evidence

The trial was made public

They even imprisoned liberal Muslim leaders and made jihadists know that terrorism is anti-Muslim.

These efforts have been spectacularly successful, creating a nation that was unimaginable 20 years ago.

Now that I've told you this, I hope you'll find some sense of my optimism.

Neither the immigration problem nor Islamic fundamentalism is insoluble.

Please join us for one more country. The last one is Mexico.

Out of the three countries, Mexico surprised me the most because, as you know, Mexico has a lot of problems.

But what this country achieved a few years ago is still a dream for many countries, including France, India, the United States.

broke through years of political stagnation

To know how, we have to go back to the year 2000, when Mexico became a democracy.

Instead of fighting for reforms with the freedom they gained, politicians fought among themselves.

Congress was in a stalemate, and domestic problems -- drugs, poverty, corruption -- were chaotic.

Things got worse and worse, and in 2008 the Pentagon warned of the collapse of Mexico.

Then, in 2012, Enrique Peña Nieto was suddenly elected president.

Peña wasn't expected much at first.

He was certainly handsome, but he was a member of the corrupt former ruling party, the Institutional Revolutionary Party, and there were constant rumors that he was involved with women.

In fact, Peña was thought to be just good-looking, and was called "handsome" by women during the election campaign.

But this handsome man surprised the nation by forging a partnership pact between the three major political parties.

Eighteen months later, all parties passed a very comprehensive reform bill.

Opening closed monopolies

Liberalization of the energy business, which had continued to struggle

Numerous reforms were carried out, including the restructuring of the problematic school system.

To give you an idea of ​​how great this achievement is, the United States Congress passed immigration reform, campaign finance reform, and financial reform.

And imagine doing it all at the same time.

That's what Mexico has done

I was able to ask Peña about the secret behind a series of successful reforms.

Peña gave me that bright smile -- (Laughter) -- and just said, "We compromise."

Of course, I asked in more detail, but the long answer was basically the same: "We compromised compromise after compromise."

I knew I needed to earn credibility quickly, and just days after being elected, I started talking to the opposition.

The discussions were small and confidential to avoid pressure from outside stakeholders, and many participants said that this close relationship and the tequila they sipped built trust.

And the fact that agreement was only by unanimous vote, and that Peña even prioritized the other party's priorities over the ruling party, helped build trust.

Opposition Senator Santiago Creel said, "I'm not going to say I'm special or anyone else is special, but that group was special."

What is the evidence?

At Peña's inauguration, Mexico broke through political stagnation for the first time in decades with a three-party pact.

wonderful

So, I've explained three major solutions through examples from three countries.

There were only good examples, right?

But is there anything we can do to help?

In researching these three countries and many other success stories, like Rwanda recovering from civil war, Brazil reducing inequality, and South Korea growing faster and longer than any other country on the planet, I've noticed some commonalities.

Before I explain, let me just say one thing.

Of course, each country has its own characteristics.

So taking one success story and applying it to another country doesn't necessarily mean it will work.

No single solution will always work

need to change depending on the situation

But if you just take the essence of the case, you can find common ground for problem solving, which can be useful in other countries, in business, in any other situation.

First, accept extreme conditions.

As you can see from the examples of the three countries, solutions are being found in situations that threaten national survival.

it's not a coincidence

In Canada, two national crises emerged at the time Trudeau took office.

First, Canada, a vast, underpopulated country, needed immigration, while Europe, with its white working population, had recovered from World War II and had stopped migration.

The other was that the long-running Cold War between the French-speaking and English-speaking countries in Canada had escalated into a real conflict.

Quebec insisted on leaving Canada, and politics was causing murders among Canadians.

The country is always in crisis.

nothing special

But where Trudeau excelled, he realized that the crisis in Canada had removed the obstacles that would normally prevent reform.

Canada had no choice but to open up to immigration.

We also needed to rethink what was Canadian.

there was no other way

So Trudeau had a once-in-a-decades opportunity to break the old rules and make new ones.

Like any successful person, he wisely took advantage of opportunities.

Second, Random Ideas Generate Power

One thing that great problem solvers have in common is that they're realists.

I don't hesitate to take what I think is the best answer, and I'll keep political parties, common sense, sentimentality, and other minor issues at bay.

As I mentioned earlier, the Indonesian Democrats wisely adopted many of the best campaign promises of Islamic parties.

He even called on some radical Islamists to form a coalition.

Many of the less religious population was terrified.

But by forcing extremists into power, their incompetence quickly became apparent, and they became embroiled in the sleazy compromises and petty humiliations so common in politics.

That caused the image of extremists to fall and never recover.

The third is to satisfy the entire nation from time to time.

You said that in times of crisis, leaders gain extraordinary powers.

Sometimes boldness alone can't solve a problem.

Sometimes you need restraint, even if that's the last thing you want to do.

In Trudeau's example, when he took office, he was able to focus only on his supporters and prioritize the French-speaking world.

It was possible to satisfy only a part of the population at all times.

Peña could have used his powers to continue attacking the opposition, just like in traditional Mexico.

But they chose to accept the opposition, while forcing the ruling party to compromise.

Trudeau promoted racial agnosticism, arguing that multiculturalism, not language or color, is what makes a Canadian citizen.

No one got all their wishes, but each got a minimal profit.

Some of you may be thinking, "OK Tepperman, if the solution you're talking about really exists, why aren't more countries using it?"

You don't need special powers to succeed

The leaders I spoke to didn't have superheroes.

No one is alone and has many shortcomings.

For example, Indonesia's first democratically elected president, Abdurrahman Wahid.

Wahid is sadly uncharismatic and has fallen asleep once, even during his own speech.

(Laughter) True story.

You know, it's not your personal ability that prevents you from succeeding, nor your circumstances.

more trivial

Big decisions come with big risks It's scary to take big risks

It takes courage to overcome fear, and as we all know, very few politicians have the courage.

But that doesn't mean that we voters are telling our leaders to be brave.

Because we elected politicians in the first place.

Given the current state of the world, we have no other choice.

We can see the answer, but it's all up to us. We're going to vote for the brave, the brave to find the answer, the one who can take the answer and make it work.

thank you

(applause)

The good news is that we've successfully prototyped a robotic ant.

The bad news is that by mistake, the robot was equipped with the ability to fire destructive lasers, and it can't be switched off.

Robot must be stopped in 5 minutes before destructive laser activates Robot must be stopped in 5 minutes before destructive laser activates

In the meantime, all the robot ants are walking exactly one meter per minute in their territory.

When it comes across another ant or hits a dead end, it immediately turns around and goes back the way it came.

After five minutes, the robots fire their destructive lasers and run away, the robots fire their destructive lasers, run away, and scatter around the world, building piles of rubble wherever they go.

The only way to stop it is to stick two emergency vacuum nozzles into the action zone and suck up the ants before they can escape.

The nozzle can be inserted anywhere in the membrane overlying the behavioral area, and the nozzle can be inserted anywhere in the membrane overlying the behavioral area, and all ants that pass by will be sucked up and stopped.

Once the nozzle is in place, you can't move it anymore. Doing so would create an escape hole for the robot ants, so it's important to have the right insertion point to avoid that.

The action zone is made up of 1m pipes put together.

When the robot reaches an intersection, it moves left, right, and forward erratically Left, right, and forward erratically

The only time it moves backwards is when it comes across another robot ant or a dead end.

The trouble is, there are hundreds of ants in the area, and if even one escapes, the trouble is, there are hundreds of ants in the area, and if even one escapes, it can wreak havoc.

Where should we put two vacuum nozzles to suck up all the robot ants in a limited time of just five minutes?

Pause this video if you want to find the answer yourself

3 seconds, 2 seconds, 1 second to answer. With so many robot ants scurrying all over the action zone, it may seem impossible to stop them from escaping. It may seem impossible to stop them from escaping.

But the situation is deceptively simple

let me explain

Imagine just two robot ants walking in front of each other Imagine just two robotic ants walking in front of each other

When the two collide, they immediately turn. When the two collide, they turn immediately.

What would be the sequence of events if we were to move forward instead of turning around? What would be the sequence of events if we were to move forward instead of turning around?

Even if you do that, the situation will not change at all before and after the collision.

It's the same wherever and whenever any two robot ants meet.

You don't have to identify each ant, you don't have to identify each ant, and if you start an ant anywhere in the area, if you start an ant anywhere in the area, you just have to find a place to put the nozzle so that you can catch it in five minutes with no collisions.

Thinking about it this way makes it easier to see the big picture and gets closer to the solution.

It seems to be the safest place to put the nozzle at the intersection of three or four pipes.

There are only 4 intersections... Which 2 should you choose?

You should choose the intersection on the upper right

Let's say there's an ant that's going from this intersection to a dead end if it doesn't get in. If there's an ant that's going from this intersection to a dead end if it doesn't get in there, it'll be back at this intersection in four minutes, and it can go in any direction for at least one minute.

If you put the nozzle in the upper right intersection, the only other likely success of the remaining intersection is the lower left intersection.The only other likely success of the remaining intersection is the lower left intersection.

To check, let's consider one ant anywhere in the area To check, let's take one ant anywhere in the area

The worst-case scenario is when the ant starts right next to the nozzle and moves away from it.

However, even in such a worst case, if the ant moves at most 4 meters, it will be sucked up by the vacuum.

If you choose any other two intersections, you're not guaranteed to catch all the robot ants in five minutes.You're not guaranteed to catch all the robot ants in five minutes.

You've avoided the biggest danger by getting rid of all the destructive robot ants.

I'd like to have a robot anteater in place so that I don't have to deal with robot ants again.

Wouldn't it be cool to have a flying, fire-breathing robot anteater? Wouldn't it be cool to have a flying, fire-breathing robot anteater?

It never ends tragically

(music) (Rainn Wilson) Loneliness just keeps ringing—

I've lost myself, it's time to find someone serious

what kind of person am i

(music) I'm a single white male, 45 years old.

i like animals

have a regular job

social

I am working out

I'm looking for—

The ideal partner, Idea Mate

Can I find the right idea for the real me?

(Ron Finley) What if there was no healthy food available?

Gardening is one of the most healing and challenging activities.

[An idea worth dating] (Rain) Wow, you got your hands dirty on the first date, right?

Ron: Gardening is one of the most healing and challenging activities.

The people around here eat nothing but terrible food.

I want you to know that growing your own food is like printing money (Rain) You look like a food education hero!

(Ron) If food is the problem, it's also the solution.

(music)

(Erin McKean) I am a lexicographer

My job is to put every word in the dictionary

(Rain) I love words too.

What if you like the words you came up with? For example, "Scuba stroking"

(Bo Lot) Do you think you see reality?

(Rain) I'm a little short-sighted, but that's okay

Bo: No, I mean, your brain isn't even connected to this world.

In fact, it's meaningless in that the perceptual information your eyes and ears are receiving can be anything.

That tree could be a huge object in the distance, or it could be a small object in front of you, your brain can't tell the difference.

(Rain) There was a time when I thought, "Wow, it's a giant," and it turned out to be just a dog

(Isabel Behnke) Bonobos, along with chimpanzees, are the closest animals to humans.

Bonobos often have sex with random partners to resolve conflicts and social problems.

(Rain) …I just wondered if there were any conflicts or social problems between us that should be resolved?

(Isabel) Good thing you're dating an idea, not me.

(Jayne McGonigal) This is the look on the face of someone trying to achieve epic victory in a seemingly impossible situation.

(Rain) A grand victory?

Jayne: A grand victory is an intensely positive outcome that you didn't even think was possible until the moment it happened.

it's not like that

"I'm not good at living life," you make a face

(Rain) I'll be honest with you

I've actually met other ideas

dating all kinds

Such that

(Arthur Benjamin) Mathematics isn't just about finding answers, it's also about asking why!

(Rain) Besides, how about some pie?

(Arthur) π?

3.14159265358979… (Reggie Watts) Whatever you do— you have to make a decision.

We are powerless without a decision

If you don't have power, you can't offer anything to those who want to solve the problems of the situation we live in now.

(Rain) "The choice not to make a decision is also one of the decisions" Was Rush singing?

(Jane) Yes!

That's the face that millions of problem solvers around the world should be wearing as they solve the problems of the next 100 years!

(Rain) …Warikan is fine?

(Arthur) …3846264338327950 28841...

…971?

(Rain) Hey, shall we go to the movies next time?

(Ron) Wow! Let's go plant some more!

(Rain) Let's go plant!

What are you planting now?

It's a bonobo!

(Isabelle) It's a bonobo! (laughs) It's a bonobo.

(Reggie) So what do you think?

(Rain) …I want a baby of your idea

(Reggie) Do you know how to say it in Russian?

(Rain) Now?

(Reggie) "Scuba stroke"

(cheers)

People forget many things

The other day, when I went to see my mother, she told me about the old days, and I'd completely forgotten about one time we were driving together.

(Laughter) (Applause) Because this is how people die.

(Laughter) I used to play that way to pass the time when I was bored or frustrated.

(Laughter) Everyone, calm down.

(Laughter) They say we live in an age of information overload.

I don't know, but I get a lot of advertising emails.

I got an advertising email from a supermarket that I can't name, mainly due to legal issues, but let's call it "Safemart."

(Laughter) It was something like this: "King's Cross Road Safe Mart only 3 weeks away from opening!!"

It's frustrating because I don't remember signing up for the mailing list and Safemart thinks I should be happy with the new store opening.

So I scrolled down to the bottom of the email and hit the "unsubscribe" button.

i thought this was the end

But a week later, I got another email saying, "Only two weeks until the Safemart on King's Cross Road opens!"

I think the click was sweet

Are you going to try to unsubscribe again?

And then, oh my God, a week later, as you might have guessed, "Only one week until the Safe Mart on King's Cross Road opens!"

The problem is this: the Internet gives us access to everything, but it also gives us access to everything.

Without the supermarkets and the promotional emails for Candy Crush Saga, it's hard to tell what's really important and what's trivial!

I was really annoyed, so I thought I'd write a complaint email with a harsh tone.

(Laughter) No... hang on, let's have some fun with this.

Instead, I replied, "I can't wait!!"

(Laughs) "I'll help you!"

I got a reply from a guy named Dan, "We're discussing your inquiry internally."

(Laughter) As if this was the object of support.

Me: "Dan, what's your plan?

How about fireworks or a castle-shaped trampoline?"

(laughs) Dan: "I don't understand what you mean."

(Laughs) I said, "I'm really looking forward to the new opening!"

(laughs) "Shall I arrange the castle trampoline?"

"You seem to have misunderstood."

(Laughs) "We will open a new store, but we are not planning to celebrate the opening."

"Then what exactly was the '3 more weeks!' '2 more weeks!' email?

I was really looking forward to it! ”

(Laughter) "I apologize for not meeting your expectations."

(laughs) "No, I'm fine.

Let's celebrate anyway!

I can't cancel the castle trampoline anyway."

(Laughter) "You're going to lose hundreds of pounds if you don't use it, Dan."

(Laughs) "Mr. Veech, I can't take responsibility for what you have arranged."

"Let's stop arguing about who did what

You and I are a team

(Laughter) (Applause) "Just to confirm, can you make sure the customer takes off their shoes?"

(Laughter) The truth is that my relationship with Dan has deteriorated a little bit, and the next email was, "Thank you. Your contact number is 99609105."

(Laughter) You won't believe it.

"group?"

(Laughs) I'm... how do I say this... [Inquiry number is 39009371]

"...Danny?" [Inquiry number is 01591320]

I was just collecting inquiry numbers

“Da…Dan-kun?”

(Laughter) "The store is open now — Dan."

(Laughter) "But Dan, I think people were wondering why we didn't have a castle trampoline :("

So back to this [contact number is 3398382]

Maybe that was the end of the story, but I remembered that anything, even something as trivial as getting out of the car, can be a game if you want to enjoy it.

So I replied, "Thank you. Your contact number is 0000001."

[Inquiry number is 1682988] (Laughter) It's like two people dancing [Inquiry number is 0000002]

Beautiful Relationship [Inquiry number is 3382982]

It continued [Inquiry number is 0000003]

It was wonderful [Inquiry number is 3782745]

But to tell you the truth, it was quite difficult. Even I had other things to do.

So with an email autoresponder program

Automatically reply to every email from Safemart

The same message is returned every time. "Thank you. Your inquiry number is..."

Inquiry numbers are also given in order each time.

I set it up on the server and ran the program.

(Laughter) And to tell you the truth, I forgot about that.

(Laughter) One day, I checked, and there was a record of a lot of email exchanges.

My reply was up to number 21,439.

(Applause) It's incredibly satisfying to think that these computer programs will be sending messages to each other forever.

I don't think it's a bad thing to set a precedent.

So remember, if you get fed up with the bureaucracy or the monotony of modern life, instead of stifling your frustration,

Let's use it as an opportunity for a humorous prank

(laughs) Thank you very much.

(applause)

Twelve years ago, I picked up a camera for the first time to film the olive harvest in a Palestinian village on the West Bank.

I thought that I was just here to shoot a one-off documentary, and that when it was over, I would move to another country.

But something kept me coming back

When people around the world usually hear stories about this region, most of them think that they just want the conflict to end.

The Israeli-Palestinian problem is terrible and I wish it would just disappear

The same is true for conflicts occurring in other parts of the world.

But every time we look at the news, it seems that more and more nations are being drawn into the flames of war.

So I've been wondering lately if we could look at conflict differently, and instead of just wishing it was over, why not focus on how to fight conflict?

It's an important question that I've been pondering for some time now, which I've been pursuing with my team at the nonprofit Just Vision.

After seeing some of the conflicts going on in the Middle East, I began to notice a pattern in some of the cases that worked out.

I wondered if there was something in common, and if so, maybe we could glean lessons for a constructive struggle, in Palestine, in Israel, and elsewhere.

We also found objective data

In a study of 323 large-scale political conflicts -- covering the period from 1900 to 2006 -- Maria Stefan and Erica Chenoweth found that nonviolent movements were nearly twice as successful as violent ones.

Nonviolent movement is also less likely to cause physical harm, both to those involved in the movement and to those who oppose it.

The point here is that this usually produces a more peaceful and democratic society.

So nonviolent resistance is a more effective and constructive way to fight conflict.

But if it's such an easy choice, why isn't it used more?

Political scientist Victor Asal teamed up with his colleagues to examine the various factors that shape the strategies chosen by political groups.

The biggest predictor they found -- whether the group was right-leaning or left-leaning -- it wasn't how much it was influenced by religious beliefs, whether it opposed democracy or dictatorship, or even how oppressive the group was, was what determined the choice between nonviolence and violence.

The biggest predictor of adopting nonviolence was the ideology of women's roles in public life.

(Applause) Activities where language related to gender equality is discussed are dramatically more likely to adopt non-violence, and thus more likely to be successful.

The results of this study also fit with what I've documented myself in organizing political movements in Israel and Palestine.

And what I saw was that the movement to welcome women as leaders, including the village of Budrus in my documentary, was much more successful in achieving its goals.

This village faced the threat of being wiped off the map at any moment, as Israel began building a separation wall.

The proposed plan would inevitably destroy the village's olive groves and cemetery, eventually cutting off the village from all directions.

Local residents, with their inspired leadership, launched a non-violent resistance movement to stop this.

Residents were at a terrible disadvantage.

But I had a secret weapon: a 15-year-old girl bravely jumped in front of a bulldozer and stopped an olive tree from being uprooted.

At that very moment, the residents of Budrus realized the potential that welcoming and encouraging women's participation in public life could create.

Then, day after day, the women of Budrus stood on the front lines, using their creativity and ingenuity to overcome the many obstacles in front of them in ten months of unarmed struggle.

By now, you should know that we won in the end.

The separation wall was transformed into the internationally recognized Green Road, and the women of Budrus later became known throughout the West Bank for their indomitable spirit.

(Applause) Thank you.

Let me take a breath here, because I want to clear up once and for all two major misconceptions that can arise at this point.

First, in my opinion, women are not inherently or fundamentally more peaceful than men.

But I think in today's world, women experience power differently.

Women, who have often been forced to navigate the world in a vulnerable position, have an ability that is easier for women to acquire than men: the skill to influence and influence those in power without being noticed.

The term "manipulative" is often used with disdain for women, but it reflects the reality that women often have had to find ways to avoid direct confrontation and achieve their goals.

Finding alternatives to direct confrontation is central to nonviolent resistance.

I'd like to talk about another common misconception.

I've talked a lot about my experience in the Middle East, so some of you might be thinking, "The solution is to educate Muslim and Arab societies so that more women are empowered."

That way you'll get better results

But that kind of intervention is unnecessary care.

Women are already involved in some of the most influential movements to emerge from the Middle East, but these facts tend to be invisible to the international community.

It's men who are by far the most often on camera, because they're the ones who are most likely to be involved in the confrontational scenes that are irresistible news fodder.

As a result, not only are women often left out of the struggle on the ground in the press, but the struggle itself is often misrepresented.

In the late '80s, a popular uprising began in Gaza that quickly spread to the West Bank and East Jerusalem.

It's an event known as the First Intifada, and those who remember the scene typically picture Palestinian men throwing rocks at Israeli tanks.

From reports at the time, it appeared that stones, Molotov cocktails, and burning tires were the only activity going on in the Intifada.

But there was also widespread non-violent movement during this period, in the form of strikes, sit-ins, and the birth of co-existence institutions.

During the First Intifada, Palestinian citizens from all walks of life were mobilized across generations, factions and classes.

It happened through the network of people's committees, and the use of direct action and the use of self-help projects within municipalities made it difficult for Israel to continue its control of the West Bank and Gaza.

First-hand testimony by the Israeli military indicates that 97% of the activity during the first Intifada was unarmed.

There's another fact about that time that was never officially told.

For 18 months during the Intifada, it was women who were in charge behind the scenes. Palestinian women from all walks of life were responsible for mobilizing hundreds of thousands of people, working together to withdraw their consent to the occupation.

A woman named Naira Ayasi encouraged Palestine to become economically independent by encouraging Gaza women to start gardening in their backyards. This activity was considered illegal by the Israeli authorities at the time. And Zahira Kamal personally led the organization that helped keep the uprising going, and it grew from 25 women to 3,000 in one year.

In spite of their extraordinary feats, when the first Intifada is being told, none of them will participate.

Women are treated the same way in other parts of the world.

For example, in the history books and in our collective consciousness, men were the prominent spokespersons for the anti-racist struggle in America in the 1960s.

But women were also a crucial force in mobilizing, organizing, and taking to the streets.

Do any of you think of the name Septima Clark when you think of the civil rights movement in America?

you can hardly

But in reality, she played a key role in every aspect of the civil rights struggle, especially in promoting literacy and education.

She's been omitted and ignored, as have other women who played key roles in the American civil rights movement.

It's not a matter of getting credit or not.

it's a deeper story

What we say has a profound effect on how we see ourselves, our beliefs about how social movements should play out, and how we lead them to victory.

How we talk about activism like the First Intifada and the era of the civil rights movement is so important and so powerful that it influences how Palestinians, Americans and people all over the world choose to act the next time they are confronted with an unjust social situation, and it creates the courage to stand up.

We cannot set an example for future generations by not acknowledging the achievements of women who have played key roles in these struggles.

Without role models, it becomes difficult for women to get their place in public.

As I mentioned earlier, the most important factor in the success of any social movement is its ideology about the role of women in public life.

The question here is whether we are moving towards a democratic and peaceful society.

There's so much going on in the world right now, and it's only accelerating, and it's not a question of whether or not we'll face conflict, but more importantly, how each story will shape how we fight it.

thank you

(applause)

Today, I'm going to talk to you about two things that I think are the cornerstones of learning from watching Khan Academy:

It's about learning and it's about mindset.

I found this out a long time ago when I was teaching my cousins

The reason many children stumble in mathematics is because they accumulate knowledge holes in their learning process.

When you start learning algebra, you think your previous knowledge is questionable and makes you believe that you're not good at math.

Or when you start learning analysis, you stumble because there's something weird about the underlying algebra.

When I started uploading math videos to YouTube, I saw it again, and the first thing I noticed was that it wasn't my cousins ​​watching --

(Laughter) The original comment was just, "Thank you."

this was a big deal

I don't know how many people watch YouTube

You won't see many comments like "thank you"

(Laughter) They usually have more thorns.

After that, the content of the comments became more intense, and one student after another said that he disliked mathematics as he grew up.

It gets harder the further you go

By the time you learn algebra, the gaps in your knowledge are so large that you can't keep up.

That's why I don't think I'm cut out for math.

But after a while, I started to feel like I should study independently.

Finding something like Khan Academy, filling in knowledge gaps, mastering concepts reinforces the mindset that math is not just a matter of talent, it's a do-it-yourself mindset.

This is how you wear things in the world.

It's the same with learning martial arts.

First, you practice until you can do the white belt tricks, and only then do you move on to the yellow belt skills.

It's the same with learning to play an instrument. You practice a basic song over and over again, and only when you've mastered it do you move on to more difficult songs.

But this is not the traditional way most of us are educated.

In traditional schooling, students are usually grouped by age group, and in middle school or so, grouped by age group and grade level, and all are taught at the same pace.

Typically, for example, when learning exponents in elementary algebra in junior high school, first the teacher explains exponents in class, and then they do their homework at home.

The next morning, check your homework answers, then class, homework, class, homework, repeat

I have a test in a couple of weeks

On the test, I'm 75%, he's 90%, she's 95%, and so on.

Knowledge holes are revealed I don't understand 25%

Even students who got A's don't understand 5% of them.

But even when we know there's a hole in our knowledge, the lesson just moves on to the next topic, the more advanced content, and then it's built on top of the hole.

logarithm or negative exponent

It just keeps going, you know how weird this is.

I didn't understand 25% of the basics, but it pushed me to more advanced topics.

It goes on for months and years, and at some point, whether it's algebra or trigonometry, you hit a wall.

It's not because algebra is inherently difficult or because the students are dumb.

30% because there is an exponent in the equation that I don't understand.

That's how you get left behind

So that you can see how ridiculous this is, let's compare it to another realm.

like building a house

(Laughter) I gather the construction workers and say, "I was told to build the foundation in two weeks.

Let's do what we can"

(Laughter) So I'll do what I can.

it might rain

The materials you need may not arrive

Two weeks later, the construction foreman comes over and looks around and says, "The concrete over there isn't dry and this part doesn't meet the standards...

It's 80% done."

(Laughter) "Okay 'C', let's get down to the first floor."

(Laughter) And in the same way, we're going to do as much as we can in two weeks.

After the construction supervisor checks it, it becomes ``75% done'' and ``D+''.

You go on to the second floor, then the third floor, and while you're working on the third floor, the whole building suddenly collapses.

The typical reaction would be that the contractor was at fault, or that they need more frequent and thorough inspections.

But the real problem is the process itself.

By artificially limiting the amount of time it takes to do something, you're making good or bad results.

In "mastery learning," we do the exact opposite.

Contrary to the conventional method of artificially fixing the time and period of learning and giving variations as a natural result, such as excellent, good, acceptable, and unsatisfactory.

You can change the time and duration of learning for each student and lock in the part that you actually learn.

What's important here is not only that students learn concepts like exponents well, but that they develop the right mindset.

Just because you got 20% wrong at something doesn't mean you have a "C" stamped in your DNA.

just keep working

Perseverance and tenacity are necessary. I understand that you must be proactive in learning.

A skeptic might say, "Well, mastery learning as an idea and the mindset that comes with it, student agency is a wonderful thing, and I know what you're saying.

unrealistic

If you try to practice, the progress of the students will be scattered

A customized course is needed for each student, requiring a private tutor and individual exercises.”

This isn't exactly a new idea. One hundred years ago, in an experiment in Winnetka, Illinois, mastery learning produced impressive results, but it was too complex to operate and could not be scaled up.

Teachers must give each student a different assignment and evaluate them individually.

But today it's not unrealistic

there is a tool for that

Need to give explanations at the student's pace?

Then there's video on demand

Need practice questions? Need feedback?

There are adaptive exercises that are tailored to the student.

And when you do mastery learning, a lot of great things happen.

Not only does it allow students to fully master concepts, but it also develops a growth mindset, perseverance, tenacity, and ownership of learning.

And all kinds of wonderful things start happening in the classroom.

It's not just about listening to a class, it's creating interaction in the classroom.

Allows deeper learning of content

You can do simulations and Socratic dialogues.

Let's do a little thought experiment to see what this is all about and how tragic the possibility of being lost is.

If you were to go to Western Europe 400 years ago, it would have been the most literate region on Earth at the time, and about 15 percent of the population could read.

If you ask someone who can read, someone like a clergyman, "What is the percentage of people who can learn to read?"

They would say, "If we had a good education system, maybe 20-30% of people would be able to read."

But in today's world, that answer seems too pessimistic. In fact, almost 100 percent of people will be able to read.

Consider a similar question: "What percentage of people can really master calculus? Or can they understand organic chemistry? Or can they contribute to cancer research?"

A lot of people will say, "If we had a good education system, maybe 20 to 30 percent of people would be able to do it."

But what if those expectations simply come from what you've experienced and what you've observed about the people around you in a non-learning-based experience in education, in a classroom where everyone is paced and knowledge holes accumulate?

Even if you got 95% of the A, what was the 5% you lost?

The holes pile up, and when you get to the advanced stuff, all of a sudden, you hit a wall and you think, "Cancer research isn't for me," or "Physics isn't for me," or "Mathematics isn't for me."

And I think that's what's actually happening, and if we do it in a mastery framework, if we're really proactive about learning, if we welcome mistakes, if we see failure as an opportunity to learn, then the percentage of people who can master calculus or understand organic chemistry will be close to 100 percent.

This is not a "nice to have"

social demand

The era called the industrial age has passed and we are entering the age of the information revolution.

there's something happening there

In the industrial age, society was pyramid shaped.

The bottom of the pyramid needs a lot of workers.

At the center of the pyramid are the information processors and the bureaucrats, and at the top are the wealthy, the entrepreneurs and the "creative class."

But in the midst of the information revolution, as you already know,

At the bottom of the pyramid, jobs are being taken over by machines.

Even the information processing in the middle is what computers are good at.

As a society, we have a question to ask: Who can participate when technology dramatically changes productivity?

Just the people at the top of the pyramid? What should other people do then?

Or do something more ambitious?

How about turning the pyramid upside down and making the creative class the majority so that most people can be entrepreneurs, arts and research?

I don't think this is a pipe dream

I think we'll get there if people can reach their potential through a mastery mindset and being proactive in learning.

As a citizen of the world, I get excited when I think about it.

Think about the fairness in the world and the speed at which civilization advances that way.

i'm optimistic about that

I think it will be a wonderful time to live

Thank you very much

(applause)

As someone who likes challenges, saving the planet is perfect for me.

the earth is in danger

Humanity is in danger of extinction for the 6th time, ``6X''

I think a lot, if there was a Coalition of Life, aka "Oooh" (Laughter), and all life had a vote, would humans be allowed to live on this planet? and

I think it's time for a verdict

I'm here to present six mycological solutions, mycelium-based solutions using fungi.

Mycelium burrows into all terrain, holds soil together, and is very tough.

Makes soil 30,000 times harder

Fungi are earth magicians that naturally break down molecules.

It produces rotting soil all over the planet.

What we now know is that the nutrients broken down by the mycelium move all the way between the plants, so the mycelium is like the mother of nutrients from alder and birch to hollyhock, cedar and Douglas fir.

For Dusty and I, this is Sunday church.

I am in love with this virgin forest. I love my home country, America, because of this forest.

Most of you are familiar with portobello mushrooms.

honestly that's the problem

When I say "mushroom," everyone thinks of portobello or magic mushrooms, and their eyes go blank and they think I'm crazy.

I want to make a permanent breakthrough in that prejudice

"Mycophobia" is the unfounded fear of the unknown that manifests itself in fungi.

Mushrooms grow very fast

21st day 23rd day 25th day

Mushrooms produce powerful antibiotics

In fact, humans are more closely related to mushrooms than to any other biological kingdom.

Two years ago, a group of 20 eukaryotic microbiologists took up "posterior flagellar organisms" and announced that they were a special kingdom that connects the animal kingdom and the fungi.

Humans are infected by pathogens common to fungi.

The best antibiotics for humans come from fungi, because fungi hate bacterial spoilage.

But this mushroom is past its prime

After releasing spores, mushrooms rot

But what I'm trying to say here is that the microbes that develop in decaying mushrooms are essential to a healthy forest.

Microorganisms nurture trees, forming sediment that feeds the mycelium.

And like this mushrooms give out spores

The spores germinate, become mycelium, and grow underground.

Mycelium can grow over eight miles in one cubic inch of soil.

300 miles the size of my foot

Photomicrographs of Nick Reed and Patrick Hickey.

As you can see, as the mycelium grows, it expands its territory and begins to spread its net.

I've been using electron microscopy for many years, taking thousands of pictures, and looking at the mycelium under the electron microscope, I realized that the mycelium is a microfiltration membrane.

Like humans, mycelium also releases carbon dioxide.

take in oxygen

But mycelium's stomach and lungs are outside the body.

Think of it like an extension of the nerve membrane.

It absorbs water as it binds soil into these cavities, or tiny pores.

they are small wells

Within these "wells", microbial colonies form.

Spongy soil not only resists erosion, but also creates a universe of microbes, giving birth to many life forms.

The first time I said it was in the early '90s, "Mycelium is the Earth's natural internet."

If you look at the mycelium, it's intricately branched.

So even if one branch breaks, there are so many branching points, what we call "hot points," that immediately create separate pathways for nutrients and information.

Mycelium has sentience

know where people are

When people walk by, they jump and try to grab the compost.

So I think the invention of the Internet was bound to happen, because we already have a biological precedent.

The Earth invented the Internet for itself, but as the apex of life on Earth, humans are now thinking about how to distribute resources to protect the biosphere.

Surprisingly, dark matter matches mycelium archetypes.

What I think is that matter came to life and became single-celled organisms, and the single cells connected and chained together to form a network.

This is the paradigm we see throughout the universe.

As you may know, fungi were the first land organisms.

Landed on land 1.3 billion years ago Plants landed hundreds of millions of years later.

How did this happen?

That's because the mycelium makes a lot of acids and enzymes, including oxalic acid.It makes countless holes in the rock, takes in minerals like calcium, and makes calcium oxalate.

So the rock becomes brittle, and this is the beginning of the first generation of soil organisms.

Oxalic acid is two carbon dioxide molecules bonded together.

Carbon dioxide is separated in the form of calcium oxalate by fungi and mycelium.

Other oxalates also bind with minerals taken from the rock matrix and sequester carbon dioxide.

It was discovered in 1859

Photo by Hoover

Taken in Saudi Arabia in the 1950s

A life form that existed 420 million years ago

His name is Prototaxites

This one is down, but it's three feet tall.

Even the tallest plants at the time were less than two feet.

Dr. Boyce, from the University of Chicago, published a paper last year in the Journal of Geology that concluded that Prototaxytes was a giant fungus, a large mushroom.

There was a giant mushroom like this on Earth

over most of the land

This species survived for tens of millions of years

After several mass extinctions, an asteroid hit 65 million years ago.

As a result, large amounts of debris were released into the atmosphere

Sunlight was blocked and the earth was infested with fungi.

Life in partnership with mushrooms has benefited, because fungi don't need sunlight.

Most recently, at Einstein University, it was discovered that fungi use radioactivity to generate energy, just as plants use light.

As to the prospect of having fungi on other planets, let's not conclude for now, at least not in my opinion.

The world's largest living organism is in eastern Oregon.

2,200 acres, 2,000 years old, you can't miss it.

The largest living organism in the world is a mat of mycelium with a thick cell wall.

How could a living thing develop such a thick cell wall even though it's so large? Even human skin protects itself with 5-6 layers.

In the right conditions, the mycelium will grow mushrooms, and it's strong enough to break through the asphalt.

we did some experiments

I'm going to tell you six ways to save the planet.

This is Battelle Labs and I did a joint experiment in Bellingham.

There are four piles soaked in petroleum waste, one for control, one treated with enzymes, one treated with bacteria, and one inoculated with mushroom fungi.

Mycelium absorbs oil

The fungus makes an enzyme called peroxidase that breaks down the bonds between carbon and hydrogen.

This is the same bond as hydrocarbons

The mycelium soaks up a lot of oil, and six weeks later, when I came back and removed the tarp, the other piles were rotten, blackened, and smelly.

When I went to the mycelium pile, it was covered in a lot of oyster mushrooms, and they were brightly colored.

Enzymes turned carbohydrates into carbohydrates, fungal sugars.

Health in mushrooms

Some have grown

You can see how much nutrients were absorbed

But something else happened that gave me an epiphany

Insects gather in the spores they release, and the insects lay eggs and become larvae.

A bird came and dropped the seed and there was an oasis of life.

The other three mountains were black dead mountains, stinking. Polycyclic aromatic hydrocarbons decreased from 10,000 ppm to less than 200 ppm in eight weeks.

I don't have a photo of the final form.

The whole mountain flooded with green life

The mycelium is the gateway seed that opens the front door and invites in other communities.

So I devised sandbags made from jute bags -- storm-downed trees and fallen branches and sandbags filled with mycelium -- and these jute sacks can be placed downstream of farms that produce E. coli or waste, or factories that produce chemical toxins, and restore habitats.

We set up a lab in Mason County, Washington, and we saw dramatic reductions in E. coli.

see this graph

Scale is logarithmic and 10 to the 8th power

The number of colonies per gram is more than 100 million, or 10 to the power of 3 is about 1,000.

From 48 hours to 72 hours, the three mushrooms reduced E. coli levels by a factor of 10,000.

what do you mean

This method is space-saving, it recycles trunks and branches that have fallen in storms, and it saves resources because storms happen every year.

One type of mushroom in particular has become of interest to us.

This is my wife, Dusty, holding a prickly pear aka Agaricus

It grows only in primeval forests and was first described by Dioscorides in 65 AD.

an ancient lung disease remedy

Habitat: Washington, Oregon, Northern California, British Columbia, etc. Extinct in Europe.

It doesn't look that big, but let's take a closer look.

A very rare mushroom

We have experts on our team who do fieldwork, and we went into old-growth forests 20 times last year.

Among them, we succeeded in culturing one individual.

Preserving the genome of this mushroom in a primary forest is of great importance to human health.

I was part of the US Bioshield program.

We boiled more than 300 mushrooms, extracted the mycelial extracellular metabolites, and submitted them.

A few years ago we received the results of an experiment.

They found three strains of agaricus that were highly resistant to the smallpox virus.

According to Dr. Kern, a smallpox expert at the U.S. Department of Defense, a compound is active if it has a selectivity index of 2 or greater.

If it is 10 or more, the activity is strong

The mushroom species we submitted showed very strong activity.

If you search for "stamets" and "smallpox," you'll find press releases that have been verified by the Department of Defense.

You can also listen to the live interview by going to NPR.org.

This made us feel better, so our next research target was, of course, the flu.

This is the first time I've shown this to people.

Discovery of three types of Agaricus that are active against influenza viruses

Here's the selectivity index: pox in the teens and twenties, but flu was unusually high compared to the ribavirin control group.

We used natural extracts, pure pharmaceutical doses.

We experimented with H1N1 and H3N2 A and B viruses.

Then, when the mixture was tested with H5N1, the selectivity index was over 1,000.

(Applause) So I think it's possible to argue that, for the defense of our nation, we have to save our old-growth forests.

(Applause) I became interested in entomopathogenic fungi, mycelium that kills insects.

'Carpenter ants' destroy houses

I looked at the Environmental Protection Agency's website, and they recommended that we study the fungi Metarhizium, which kills termites and carpenter ants.

i did something unheard of

They tracked down the mycelium that had finished sporulating.

this is the spore

I've modified the culture so that it doesn't produce spores.

The industry spent more than $100 million trying to create termite baits to prevent termites.

But bugs aren't stupid, and they can avoid spores, so don't make spores.

I put it in a plate for my daughter's Barbie, and I put it in a place where a colony of carpenter ants was devouring the house every day.

I took it to the queen ant

After a week, the sawdust is gone.

And then dinner and death danced a delicate dance, and the mycelium that the ants ate was mummified and, you know, mushrooms popped out of the ant's head.

(Laughter) After the spores are formed, the spores drive the ants away.

That's why our house is no longer infested with ants.

We've got a semi-permanent termite repellent method.

Our house collapsed, but we got the first patent for how to repel carpenter ants, termites and fire ants.

Then we tried the extract and wow! I was able to manipulate the direction of travel of the insect.

this is a big deal

The second patent is a blockbuster

You could call it a Graham Bell-class invention.

Effective for over 200,000 species

I've been told by pesticide industry executives that this is the most disruptive technology they've ever seen.

This invention will change pesticide manufacturers around the world.

We could get 100 PhD students to get their degrees, because my guess is that entomopathogens attract insects before they can sporulate, and once they've sporulated, they're repelled.

I needed a transportation system, so I came up with the Life Box.

Life Box - You buy the DVD of the TED conference, right? - If you add soil and water, you'll get spores, mycorrhizae, and endophytes, like Agaricus.

The seeds then receive their nourishment from this mycelium.

If you sow a tree seed in a box, hopefully a virgin forest may grow out of the box.

My ambition is to revolutionize transportation systems and the way we use cardboard boxes around the world, and make them greener.

If you have a participatory site like YouTube where you can interact with a specific zip code and people can work together, you'll see Virtual Earth, Google Earth, satellite imagery systems where the trees from the Life Box are absorbing carbon.

If you have a cardboard box to put your shoes in and you have water - this is a method I developed for refugee camps - corn, beans, pumpkins, onions, etc.

I brought some containers - and my wife hopes anyone can do it if I can - and made a seed garden.

After that, I harvested the seeds, thanks to Eric for helping me, and I'm going to harvest the seeds for the garden.

You can harvest corn and you only need a few grains

Add mycelium to it and plant it on the corn cob.

And from just three cobs, a lot of fungi began to grow.

The "carbon bank" will be overdrawn and the colony will be closed.

But what happens then?

When the mushrooms are harvested, but very importantly, the fungus transforms the cellulose into sugar.

So the idea came to me, how do we deal with the energy crisis in this country?

What I came up with was "Econor".

If you use mycelium to make ethanol out of cellulose, you can immediately get all the effects that I've described today.

But making ethanol out of cellulose isn't an environmentally smart strategy.

Let's store carbon on the ground and regenerate the soil

Humans must coexist with these creatures.

I believe that by studying fungi, I can help save the world.

thank you

(applause)

As a journalist, I like to look for stories that quietly unfold behind sensational headlines.

On the other hand, I've also worked on finding a place to live, choosing a partner, and having children.

Over the last few years, I've been trying to understand what the 21st century equivalent of a good life is, because I'm fascinated by the ethical and philosophical implications of this question, and because I'm desperate for the answer myself.

we live in uncertain times

In fact, for the first time in American history, a majority of parents believe their children will not have a better life than they do.

This is true regardless of whether you are rich or poor or of any gender.

Now, some of you may feel sad when you hear this story.

At the end of the day, what has always been deeply rooted in America is the idea of ​​economic transcendence, that the next generation will surpass the current generation, the idea that children earn more than their parents, have more purchasing power, and become richer.

We've exported this dream all over the world, so in Brazil, China and Kenya, it's an inherited quest for more and an insatiable desire for children.

But when I first read the results of this historic poll, I was not disappointed.

i thought it was provocative

By whose standards is a better life?

Does a better life mean finding a stable job that you can depend on for the rest of your life?

Such jobs are almost extinct.

People change jobs on average every 4.7 years, and it's estimated that by 2020, almost half of Americans will be freelancers.

So can a better life be just a number?

Does it mean earning as much money as possible?

By this metric alone, we are underdogs.

Inflation-adjusted median per capita income has been flat since about 2000.

Okay, so what's a better life than owning a white-fenced mansion?

fewer people do

Nearly five million people lost their homes in the Lehman Brothers crisis, and many more have reluctantly accepted the reality of long-term loans, and in many near-exploitative cases, have been hoarded only to maintain their real estate deeds.

Lowest home ownership rate since 1995

So our generation won't have stable employment, they won't earn as much as their parents, and they won't be able to live in a fancy mansion.

We must say goodbye to everything that made America great.

But — are these the best yardsticks by which to measure the power of nations and the quality of life?

I believe that what makes America great is the spirit of reform.

In the aftermath of the financial crisis, many Americans are trying to redefine what it really means to live a better life.

It turns out that it has a lot more to do with community and creativity than dollars and cents.

Let's be clear, the 14.8% of Americans who live in poverty need money -- plain and simple.

And we all need policies that keep us from being preyed upon by employers and financial institutions.

The takeaway from this result is that there's no ethical permissibility for a big divide between the rich and the poor.

But we often stop the discussion there.

We talk about poverty in a stereotypical way, as if the poor were the only victims.

Through my research, I've also learned that the art of living well is often best practiced by the most vulnerable.

Now, if necessity is the mother of success, it's becoming my credo -- recession may be the father of awareness.

That's when you're forced to face essential questions, questions that you're lazy to think about when you're reasonably comfortable.

how should it work?

how to live

As we search for answers to questions like these, we unknowingly or unknowingly hear the words of our ancestors whispering in our ears.

My great-grandfather was a Detroit drunk who managed to get the occasional factory job.

Believe it or not, my great-grandfather had 21 children with a woman who was my great-grandmother, who died of ovarian cancer at the age of 47.

Now that I'm pregnant with my second child, I can't imagine the hardships my great-grandmother went through.

By the way, I have 6 pairs of twins.

So my grandfather, the son of my great-grandparents, became a traveling salesman and had a life of ups and downs.

When my father was a kid, when debt collectors came, he would come to the front door and tell them that his parents weren't home.

My dad actually took the braces out himself with pliers in the garage when my grandfather was told he couldn't afford to go to an orthodontist anymore.

So my dad naturally became a bankruptcy lawyer.

Sounds like a novel, doesn't it?

What my father desperately wanted was to provide a stable foundation for my brother and me.

The question I'm posing earlier is through generations of toil.

My parents made sure that I grew up on a stable foundation so I could question, take risks and make the leap.

And ironically, and sometimes my parents don't like it, my parents' obsession with stability has led me to question the value of stability, and to question whether stability, as traditionally defined, is still worth it in the 21st century.

So let's dig into the first question: How should we work?

We should work like our mother's generation did.

Yes — we've been trying for decades to fit women into a society built for office men.

Many women felt cramped, but others forged untraditional paths because they had the resilience to connect their purpose in life with their money and do what they had to do for the families they loved.

My mother used to say, "The balance is the balance."

It's what career advisors call a "career portfolio."

Whatever you call it, more and more men are yearning for this kind of balanced, unhurried life.

Men, too, want their role as fathers and sons and are realizing their responsibilities.

In the words of visual artist Anne Hamilton — “Work is a way of gaining knowledge.”

There is knowledge that can be learned from labor

In other words, to work is to understand the world.

If this is true -- I believe so -- mothers back then were disproportionately cared for the little ones, the sick, the elderly, and they benefited disproportionately from the deepest knowledge: the knowledge of one's situation.

It seems that men, too, are trying to expand the scope of human life in general by giving priority to taking care of others.

Now, this means that the nine-to-five shift doesn't work.

Time clocks as career ladders are dying out.

Industries are born and die every day

It is useless on the extension line so far

We should stop asking children questions like, "What do you want to be when you grow up?"

Instead, ask, "How do you want to work when you grow up?"

The next generation of work will continue to change

their common denominator is themselves

So the better you know what you're good at, the better you're able to recruit the ideal collaborators, the better off you'll be.

The challenge for the future is to rebuild social safety nets to adapt to an increasingly fragmented economy.

Health insurance needs portability

We need policies that apply to all vulnerable populations and support vulnerable others without falling into poverty.

We need to seriously consider a minimum income guarantee for all citizens.

We need to reform the organization of labor from the ground up

A view of work built to fit 21st-century values ​​is not the outdated idea of ​​a family's living expenses. That idea is out of date.

Now for the second question, "How do we live?"

We should live like our immigrant ancestors.

When our ancestors came to America, they often shared homes, shared life skills, and shared parenting, and they knew how to always have an extra meal for one, no matter how much food they had.

But for people back then, success meant leaving the village and owning the white-fence mansion that represented the American dream.

Today, we still see white-fenced mansions and think of success and a calm life of luxury.

But when you take the sentimental part out, the white fence is what divides us.

What many Americans have rejected, the white fence and the highly personal lives that take place within it, is what they're trying to reclaim instead, the old-fashioned village life of interdependence.

For example, 50 million Americans live in multi-generational households.

This number jumped up due to the Lehman shock, huh? Many people felt that this kind of life wasn't so bad.

Two-thirds of people with multiple generations living under one roof say their relationships have improved.

Some people don't share one roof with their family, but with a complete stranger who sees the health and economic benefits of everyday society.

CoAbode is an online platform for other single mothers to share a house with 50,000 registered users.

And people over the age of 65 are especially conspicuous looking for these new forms of housing.

They understand that their quality of life depends on both privacy and solidarity.

Come to think of it, this is true for men and women of all ages.

For too long we have pretended that happiness is the ruler of a single country.

But every survey yields different results.

The survey found that the healthiest, happiest, and safest people to live — Americans who live with neighbors in everything from crime to climate change disasters.

Well I have experienced this first hand

I've been living in co-housing housing for the last few years.

Over 6,000 square feet of land, with dozens of persimmon trees and thick bushes of fruit-bearing blackberries that weave around a communal garden, in the middle of downtown Auckland, by the way.

Nine separate dwellings of varying sizes and shapes have been built, but each dwelling has been built as environmentally friendly as possible.

There are big, glowing black solar panels on the roof, and it's rare that the monthly electricity bill for each home is more than five dollars.

The 25 people who live here are all different ages, different political beliefs, different occupations, and each house has everything you would find in a normal house.

But on top of that, we have a communal kitchen and dining room big enough to open a restaurant, and we all eat together twice a week.

Now, when I tell people that I live like this, I often get one of two extreme reactions.

Do you say, "I wish everyone could live like this"?

"I absolutely refuse to live such a horrible life."

Let's be clear: while we respect each other's privacy, we also focus on what we call "radical kindness."

What is the most surprising thing about living in a community like this?

Not only do we share household chores like repairs, cooking and weeding, but we also share emotional struggles.

Instead of relying solely on your ideal family and trying to satisfy all your needs, you can have 20 different people complaining about hardships at work or sharing how you're coping with teacher violence.

Teenagers in the community often go to adults other than their parents and ask for advice.

Ms. Bell Hook, in an understatement, called this "revolutionary" parenting. Children thrive when they're inspired by and depend on the diverse adults around them.

This was actually a healthy environment for adults too.

Building the perfect home behind a white fence comes with a lot of pressure.

What I call "the new version of a better life," is to stop focusing on the perfect home and focus more on the imperfections around us, whether it's relatives living under one roof, or co-housing communities like mine, or neighborhoods where you know a lot of neighbors and can talk to each other.

I mean, it's a sensible society.

But often when money is involved, it can be difficult to reach out.

The most trustworthy assets are found in relationships

"The new edition of a better life" isn't even a matter of individual prospects.

In fact, if you've been a failure or feel like a failure, it's okay. You might be a success, if you look at it by the criteria you've never considered.

Even if you earn a modest amount, you may be a great father.

Even if you can't buy your dream home, a house party with your neighbors might be called a legend.

Even if you have textbook success, what I'm trying to say may be even crueler.

The world won't punish you for being an underdog by the standards you hold dear.

you decide

Even if I were rich enough to feed everyone comfortably, I don't think I would be able to show how great my great-grandmother, who lived a short and unreasonable life, was.

Money is not the solution to escape from suffering and aim for a meaningful life.

No amount of house, no matter how big, can erase the pain my great-grandmother had to endure.

To show how great my great-grandmother is, I need to be as close to people as I can be and live with the courage I can.

In today's world of anxiety, it's natural to feel lonely.

In this feeling of insecurity, you can choose to live rigidly and crumblingly, or to live supplely.

Will you become introverted and lose faith in your ability to reform the system, and will you lose faith in yourself?

Or do we become extroverts and develop trust in our ability to reach out, connect and create?

At the end of the day, the greatest danger isn't that the American Dream won't come true.

The most dangerous thing is to make a dream you don't believe come true.

let's stop that

Challenge yourself to do something more interesting, even if it's difficult, and this is how your life will be: Your daily actions, the people you give your best love, your talents and your energy to, will be as close to what you believe in as possible.

It's not just a trivial matter of making money, it's about embodying gratitude to your ancestors.

That kind of effort is beautiful

thank you

(applause)

Concussion is a far more terrifying word than it used to be, and I feel it myself.

I've been hit in the head thousands of times in my ten years playing football.

The worst thing that happened was that I had a couple of bicycling accidents and suffered concussions, and even as I stand here, the effects of the most recent one are still there.

There is evidence of concussion anxiety.

Repeated concussions can lead to early dementias such as Alzheimer's disease and chronic traumatic encephalopathy.

The Concussion, starring Will Smith, deals with these subjects.

You know that American football and the military are more likely to cause concussions, but few of you may know that cycling is the number one cause of sports-related concussions in children.

So here's one more thing you probably don't know, and that's that helmets used in many sports, including football and cycling, are not designed or tested to adequately protect children from concussions.

It was actually designed and tested to protect against skull fractures.

So the question I get from parents all the time is, "Would you like your child to play football?"

Or, "Should my child play soccer?"

It's not yet an area where we can confidently answer.

So let's look at this question from a slightly different angle: How can we prevent concussions?

Or is it possible to prevent

Most experts believe it's unpreventable, but research in my lab is giving us more information about concussions and allowing us to better understand them.

The reason why helmets prevent skull fractures is that it's pretty simple: we know how it works.

Little is known about how concussions occur.

To help you visualize what happens when you get a concussion, I'm going to show you a video that you can find by searching Google for "what is a concussion?"

Now, the Centers for Disease Control and Prevention (CDC) has a website, and if you watch the video, you'll get a complete picture of concussions.

In the video, when the head moves forward, the brain lags behind, and the brain gradually speeds up and crashes into the skull.

And there it bounces off and hits the other side of the skull.

And as you can clearly see in this NFL-funded CDC video, the surface of the brain, where it hits the skull, appears to be damaged.

Now, as for this video, in some ways, it's a true representation of what scientists think about how concussions work, but it also has a lot of things wrong with it.

One thing that I, and probably most experts, have in common is that the brain works in many different ways.

The brain lags behind the movement of the skull, and after catching up with the movement of the skull, it moves back and forth and also vibrates.

i think this move is real

But the degree of brain activity seen in this video is probably not quite right.

There's almost no extra space in the skull, just a few millimeters of space filled with cerebrospinal fluid that protects it from trauma.

And the brain probably moves very little inside the skull.

Also, in this video, it looks like the brain is moving as one solid mass, but it really isn't.

The brain is one of the softest things in our body, and it's kind of like jelly.

So when the head moves back and forth, the brain distorts, turns, twists and stretches the tissue.

Most experts probably agree that concussions don't occur at the surface of the brain, but at a deeper level, in the center of the brain.

So we're using devices like this to approach the problem in order to understand the mechanism of concussion and prevent concussion.

it's a mouth guard

It's got sensors like those in a cell phone -- accelerometers, posture control devices, things -- that take measurements 1,000 times a second and show you how your brain is doing when you bump your head.

Here's how the mouthpiece works: it fits over your teeth.

Teeth are very hard parts of the body.

It's solidly attached to the skull, and it's the most accurate way to measure how the skull moves.

Some people have tried the helmet method.

We've tried other sensors that come in contact with the skin, but they all move too much, and we've found that the mouthpiece provides the most reliable data.

Now that we have this device, we can learn more than we can from cadavers. Until now, the best way to understand concussions was from cadavers, but now we can learn much more from living humans.

But where do you find willing volunteers who routinely get concussions from bumping their heads when they go out?

Actually, I was one of them, our Stanford football team.

And this is our lab, and for the first time, I'm going to show you the scene where we measured concussions with this device.

The thing to notice is that it has a posture control device that measures the rotation of the head.

Many experts believe that measurement of rotation is the most important factor in understanding what is happening in a concussion.

watch this video

(play-by-play) The Cougars are late, the ruck is playing with ease, Winslow clashes

Are you okay

(Audience cheers) It's on the top of the screen.

At real speed, you'll hear something like this.

The thing that hit me was -- (David Camarillo) Sorry, three times was a bit too much.

but as you can see

All you'll know from this video is that he hit his head hard and injured himself.

But when you extract the data from the mouth guard he was wearing, you can see much more detailed and diverse information.

One of which is that he was attacked from the lower left side of his mask.

Something happened that was a little counterintuitive

his head didn't move to the right

It actually turned to the left first.

And after the neck was compressed, the force caused it to bend backward to the right.

So we think that this side-to-side movement is similar to the phenomenon of whiplash, which ultimately leads to brain damage.

This device can measure the movement of the skull, but it can't tell us about the actual movement of the brain.

So we collaborated with Svein Kleiben's group in Sweden.

they developed a finite element model of the brain

So here's a simulation model of that. Using the crash data from the mouth guard that I showed you earlier, we can see changes in the brain. And here's a cross section of the front of the brain.

You can see that it's very different from the CDC video.

The color you see now -- it's an indication of how much brain tissue is stretched.

Red is 50% stretched

What that means is that certain parts of the brain were stretched by 50 percent from their normal length.

And what I want you to see the most is this red part.

This is very close to the center of the brain, and compared to the CDC movie, you don't see colors like this very often on the surface.

I'm going to give you a little more detail on how we think concussions happen. What I want to tell you is that what we and others have found is that when the head rotates in this direction, concussions are more likely to occur.

This move happens a lot in sports like football -- and this move looks even more dangerous, but what exactly is going on?

One thing you'll notice is that the human brain, unlike other animals, has two large hemispheres like this.

right brain and left brain

What I want you to see in this diagram is that between the right and left hemispheres, there's a large groove that reaches deep into the brain.

In these grooves, which you can't see in this picture, but believe me, imagine, there's a sheet of fibrous tissue.

It's called a sickle, and it runs from the front to the back of the head, and it's very strong.

Because of this structure, when the head moves from side to side in a collision, that force is quickly delivered to the center of the brain.

What is the bottom of the ditch like?

This is a brain connection -- actually, this red bundle of nerve fibers at the bottom of the sulcus is the largest bundle of nerve fibers -- the connection between the right and left hemispheres of the brain.

This is called the corpus callosum

We believe that this is the most likely mechanism of concussion, that the force travels down and reaches the corpus callosum, causing a dissociation between the right and left hemispheres of the brain, which explains some of the symptoms of concussion.

This result is also seen in the chronic traumatic encephalopathy I mentioned earlier.

This is a cross-section of the brain of a middle-aged ex-football player. What I want you to see here is the corpus callosum.

So are all the intraventricular spaces.

These ventricles are much larger than normal—

The tissue near the center of the brain died over time.

This information is perfectly aligned

I have some good news for you.

What we've noticed is specifically about the damage mechanism: the force is transferred to the bottom of this groove very quickly, but it still takes a certain amount of time.

So if we slow down the movement of the head so that the brain doesn't lag behind the movement of the skull -- it moves with the skull, we may be able to prevent a concussion.

So how can we slow down the movement of the head?

(Laughter) It's a giant helmet.

More space buys you more time. It's a little joke, but I'm sure some of you have seen this.

It's a proper sport called bubble soccer.

In fact, the other day, I saw a young man playing this sport near me from my house, and as far as I know, no concussions have ever been reported in this sport.

(Laughter) Seriously, this theory explains it, but it went a little too far.

This is not realistic for cycling or football.

So we partnered with a Swedish company called Hoovding.

You may have seen it, but they're using the same air principle to create more space around the head to prevent concussions.

Don't let your kids try it at home

This stuntman isn't wearing a helmet

Instead, he wears a collar, and this collar has the same type of sensor that a mouthguard has, and when he's about to fall, it senses that and the airbag pops out, essentially in the same way that an airbag in a car works.

And in experiments with their device in my lab, I've found that in some cases, it significantly reduces the risk of concussion compared to a regular bicycle helmet.

I think it's a very interesting product.

But to really benefit from concussion-preventing technology, you have to meet the criteria.

This is reality

The device is already on sale in Europe, but it won't be available in America for the foreseeable future.

I'll tell you why

There are good reasons and not-so-good reasons

Bicycle helmets are federally regulated

Under the jurisdiction of the Consumer Product Safety Commission, bicycle helmets are approved for sale, and this is the test they use.

This brings me back to the skull fracture I talked about earlier.

The purpose of this exam is for this approval

Of course this test is important

We can save lives, but I don't think it's enough.

For example, this test doesn't assess that the airbag is deployed when and where it's needed and not when it's not.

Similarly, this assessment does not tell us whether helmets protect against concussions.

And unregulated football helmets are doing similar tests.

No government regulation

There are industry body tests, and I think that's the case with a lot of industrial products.

But the group has been less than enthusiastic about updating the standards.

So in my lab, we're not just looking at the mechanism of concussion -- but we're looking at better testing standards.

And governments want to use this information to drive innovation in technology, by telling consumers how effective certain helmets are.

And finally, I'd like to go back to the first question, which is, is it okay for my child to play football or ride a bicycle?

I'm going to answer this based on my own experience with injuries.

I'm a little apprehensive about my daughter Rose riding a bike.

She's a year and a half, and she already wants to cycle down the streets of San Francisco.

this is one of the ways

My personal goal, and what I believe is possible, is to develop these technologies further, and in fact, in my lab, I'm trying to figure out how to best use the space inside the helmet.

And when she's ready to ride a motorcycle, I'm pretty sure we have some kind of product that's compliant -- that can actually reduce her risk of concussion.

And I think some of you here need it more quickly, so what I want to accomplish in the next few years is to be able to tell parents and grandparents that it's safe and healthy for your child to do these activities.

And I'm very lucky to have such wonderful people at Stanford who I can work with to make that happen.

I'd love to come back here in a few years to give you a final report, but all I can say for now is don't be scared when you hear the word concussion.

there is hope

thank you

(applause)

I never planned to become a parenting expert.

In fact, I'm not really that interested in parenting itself.

But there are some peculiar ways of parenting these days that are either ruining the child or hindering the child's chances to thrive.

There's a certain peculiar way of parenting these days that's getting in the way.

I think we've spent a long time making a big deal about parents who don't want to get involved in their children's lives, in their education, in their upbringing, and they're right.

But on the other end of the spectrum, there are parents who are doing a lot of harm, and I feel that if their children are to succeed, I have to do whatever it takes to protect them, to put up a line of defense, to keep track of everything around them, to constantly micromanage them, and to encourage them to get into a handful of colleges and careers.

If you raise them this way, I'm not someone else's problem, because I've raised two teens myself, and I'm one of those people.

This is what a checkered childhood looks like

Is the child's environment safe and healthy? Is there enough food and water?

It's not just about grades, it's about scores, it's not just about grades and scores, it's about awards and awards, sports and other activities, leadership.

Start a club because it will be evaluated by the university.”

Also check the service activity item

I have to show the university that I am considerate.

(Laughter) All of that to be done with desired perfection.

We expect our children to perform at a level of impeccability that they have never been asked to perform. It demands a lot from us, and that's what parents think.

And so we spend much of the time we spend with our precious children pushing, encouraging, guiding, helping, interjecting, sometimes nagging, worrying whether they're failing, narrowing the path, ruining their future, and whether they're getting into the handful of colleges where most applicants fail.

On the side of a child who spends his childhood full of checkpoints,

I don't have time to play first

I have a busy afternoon because everything I do has to be profitable.

It's as if every homework, quiz, and activity is a critical moment in a parent's vision of their child's future.

In a childhood filled with checklists, parents say they want nothing but happiness for their children, but the first thing they usually ask when they get home from school is homework and grades.

Children look at their parents' complexions and believe that it's a good "A" grade that brings them their approval, their love, their true worth.

And then the parent walks beside the child and keeps trying to flatter him, like a trainer at a dog show (Laughter), day after day telling him to jump a little higher and fly a little farther.

And when children enter high school, they don't think, "What kind of study will be interesting? What kind of activities should I do?"

I tell my counselors, "What do I need to do to get into a good college?"

When grades start rolling in in high school and they're about to get a B or, perhaps, a C, kids scramble to text their friends, "Did anyone get into a good college with these grades?"

Children leave high school, no matter what the situation, they're all out of breath.

vulnerable

I'm burnt out

I'm a little older than my years, and I wish the adults would have said, "Enough is enough."

Children are more likely to suffer from anxiety and depression and are weak. Some of them ask themselves this question: Will there ever come a time when my life is worth it?

From our parents' point of view, it's definitely worth it, isn't it?

But children get the impression from their parents' attitudes that if they don't get through the narrow gates of college and career that their parents envision, they don't have a future.

Or maybe parents are just afraid that their child's future won't be something they can brag about to their friends or put on the back of their car and show off.

you understand

(Applause) But if you look back at what you've done as a parent, if you've got the courage to look back, you'll see that children think their worth is in their grades and scores, and that we, who live in the minds of our precious children during their developmental stages, are sending out messages like, "Without me, you'd never achieve anything."

By over-helping, over-protecting, over-directing and caring, we deprive our children of the chance to develop a sense of self-efficacy, a concept that is fundamental to the human psyche, and much more important than the self-esteem that a child gains every time a parent praises them.

Self-efficacy develops when you feel that your actions lead to results, right?

(Applause) It's nurtured when your actions lead to results, not what your parents did for you.

Simply put, self-efficacy in a child is imperative, but it requires them to think, plan, decide, do, hope, coping, trial and error, dream and experience life much more than they do now, all on their own.

Now, did you hear me say, "All children are hardworking and motivated, and parents don't need to be involved in their lives, just shut up and leave them alone"?

No way!

(Laughter) I didn't say that.

What I'm saying is that the idea that grades and scores and awards and awards are the purpose of childhood, all to expand that hope to get into a handful of colleges and a limited number of careers, is a very narrow definition of success for our children.

Parents' help can make children successful in the short term. It's too much help, but if parents help with homework, their grades will improve, and if parents help them, they'll have more achievements in childhood.

Parents shouldn't worry about the particular college their child might take or attend, they should be more concerned about whether their child has the habits, the mindset, the skills, the health that will enable them to succeed wherever they go.

What I'm saying is that for the sake of children, parents need to be less obsessed with grades and grades, and more and more interested in childhood, where they can build the foundations of success, on the basis of love and chores.

(Laughter) (Applause) Housework Housework Did you hear that?

It's true. Let me explain why.

The longest study ever to track human change is Harvard University's "Grant Study."

It turns out that the source of our parents' desire for professional success in life is the housework they did in childhood. The sooner you start, the better. It's that mindset of rolling up your sleeves and helping out that tells you, "It's a nasty job, but if someone doesn't do it, I'll do it."

I'm sure you understand

(Applause) We all know this, but in a childhood full of checklists, we're exempting our kids from helping with household chores, so as a grown young man, we go to work and have a checklist waiting for us, even though we don't have one.

You can't think, "How can I get a few moves ahead of what my boss wants?"

A second very important finding from the Harvard Grant Study is that the source of happiness in life is love. It's not the love of your job, it's the love of the person you are, the love of your spouse, your partner, your friends, your family.

Children need to be taught to love at an early age. They cannot love others without loving themselves first, and they will not learn to love themselves without unconditional love from their parents.

(Applause) Right.

So instead of obsessing over grades and grades, when your precious child comes home from school or you come home from work, turn off your electronic devices, put your cell phone aside, look them in the eye, and let them see the joy on our faces that we've had for the first time in hours.

And then I always say, "How was your day?

what's the best thing about today ”

When you're a teenager, like my daughter, you say, "Lunch." I want to ask you a math test.

You say, "What did you like for lunch today?"

Let them know that they are important to their parents as human beings, and that grades don't matter.

Now, I'm sure you're all thinking, "Housework and affection are all very well, but wait a minute.

What colleges want is high scores, top grades, recognition and awards."

That's what the best-branded universities want in their kids, but there's good news.

Contrary to what the college ranking scheme would have us believe, (Applause) You don't have to go to the best branded colleges to be successful and happy in life.

Some of the successful and happy people went to their local public schools, some went to small obscure colleges and community colleges, some went to college but dropped out.

(Applause) The evidence is in this room and in our society to show that it's true.

If we broaden our horizons and try to open our eyes to more colleges and let go of our ego, we will accept this truth and realize that even if our children don't go to branded colleges, the world is unlikely to end.

And even more importantly, if you've spent your childhood not following that diabolical checklist, when your child goes to college, it's going to choose where it goes, no matter where it's going, and it's going to be driven by their own passion, and they'll have the power to succeed wherever they go.

let me confess one thing

I told you I have two children, Sawyer and Avery.

both are teenagers

I used to feel like Sawyer and Avery were growing a bonsai tree. (Laughter) I was trying to carefully prune them to make them perfect as human beings.

But I realized after working with thousands of other people's children -- (Laughter) and raising my own children, my children are not bonsai.

I don't know if the child is a wildflower, or if it's a genus Nani, it's wild. (Laughter) My job is to strengthen my child through a nutritious environment and household chores, and to love my child so that he or she becomes a child who loves others and can accept love.

My role is not to raise my children the way I want them to be, but to help them shine.

thank you

(applause)

Do you know such news

The news that we are in the clean energy revolution.

I live in Berkeley, California, and every day I see brand new solar panels on brand new roofs and electric cars on the road.

At times Germany gets half of its energy from the sun, and now India has committed to building ten times as many solar panels as California by 2022.

Even nuclear power seems to be gaining attention again.

Bill Gates is working with engineers in China, where 40 companies are working together to be the first to build nuclear reactors out of radioactive waste, and they won't melt, and they're cheaper than coal.

So you might be wondering, is the whole global warming problem going to be easier to solve than we thought?

That's the question I wanted to know, so my colleague and I decided to do some research.

We were a little skeptical about some of the talk of the clean energy revolution, but what we found surprised us.

The first is that clean energy continues to grow.

That's the amount of electricity we've gotten from clean energy over the last 20+ years.

But if you look at the share of global electricity from clean energy sources, it's actually gone from 36 percent to 31 percent.

And given climate change, we have to go in the opposite direction, getting 100 percent of the electricity we consume from clean energy, and as soon as possible.

So don't you think, "So how much is 5% of the world's electricity?

” It is a considerable amount.

It's about 60 times the size of Diablo Canyon, the last nuclear power plant in California, and about 900 times the size of Topaz Power Station, one of the largest solar power plants in the world.

This fact is simply that fossil fuels are growing faster than clean energy.

it is understandable

There are many poor countries that still use wood, cow and horse dung, charcoal as their main source of energy, and they want modern fuels.

But there is another reason, and that is that one of the clean energy sources is constantly declining in absolute numbers, not in relative terms.

it's nuclear

You can see that its power generation has decreased by 7 percent over the last 10 years.

I often hear people say that solar and wind are making so much progress that it's not really a problem, because solar and wind are making up for the shortfall.

But this data says otherwise.

You can see that all the energy produced from solar and wind combined does not make up for half of the nuclear loss.

Let's look at a familiar example from the United States.

Over the past few years, like 2013 and 2014, we've decommissioned four nuclear power plants ahead of schedule.

Almost all of them have been replaced by fossil fuels, and as a result, we've lost about as much electricity as we get from clean energy from the sun.

it's not just our case

California has been hailed as a leader in clean energy and climate change, but this data shows that California has actually been slower to reduce its carbon emissions than the national average, between 2000 and 2015.

what about germany

use a lot of clean energy

But look at this data: Germany's CO2 emissions have actually increased since 2009, and no one would think they're on track to meet their 2020 climate goals.

It's easy to see why

Solar and wind provide energy about 10 to 20 percent of the time. Even when the sun isn't shining and the wind isn't blowing, hospitals, homes, cities and factories need energy.

Batteries have made some truly amazing advances in recent years, but they're not as efficient as the power grid.

If you charge the battery once and use it later, you lose 20% to 40% of the energy just by doing that.

So in California, we're trying to plug all of our solar energy into the grid -- right now, we get about 10 percent of our electricity from the sun, and when the sun goes down and people come home from work, turn on the air conditioners, turn on the televisions, turn on the appliances in their homes, they're going to need natural gas power to do the work.

So we decided to store natural gas near the mountains.

It worked fine for a while, but then at the end of last year, we had a natural gas leak.

this is Aliso canyon

It released a lot of methane, an amount equivalent to the emissions of 500,000 cars on the road.

We blew most of our climate change response that year.

what about india

Sometimes you have to go there to get the right data, so we went to India a few months ago.

When I met with senior officials in charge of solar, nuclear and other things, they told me, "We actually have a bigger problem than Germany or California.

We have no backup power plants, no natural gas at all.

that's not all

We want 100 gigawatts by 2022.

But last year it was only 5 GW and the year before it was 5 GW."

So let's take a closer look at nuclear power.

The UN's Intergovernmental Panel on Climate Change summarizes the carbon content of all the different fuels, and you can see that nuclear power is very low.

And nuclear power obviously produces a lot of energy, 24 hours a day, 7 days a week.

A single reactor can supply electricity 92% of the time of the year.

The interesting thing is that when you look at the countries that are deploying different kinds of clean energy, none of them are developing at the pace they can meet the climate crisis.

So nuclear power seems like a very good choice, but it also has a big problem, and that's what all of you are aware of, and people really don't like it.

About a year and a half ago, there was a survey of people all over the world, not just in the United States and Europe.

A survey found that nuclear power was actually the least popular type of energy.

Even oil is more popular than nuclear

And nuclear power is slightly better than coal, but coal is not as feared as nuclear power, it's an unconscious fear.

what is our fear

There are actually three

There's the safety of the reactor itself, the fear of having a core melt and causing damage, and the waste that's being produced, and there's the weaponry.

I think it's natural that engineers are driven by these concerns and look for technical solutions.

That's why Bill Gates developed a new nuclear reactor in China.

So there are 40 entrepreneurs working on this problem.

and I am very much looking forward to it

I'm also writing a report on "Cost Reduction of Nuclear Energy."

I have high hopes for thorium reactors in particular.

So when James Hansen, a climate scientist, asked me if I wanted to go with him to China to see the latest nuclear program, I jumped at the chance.

Accompanied by researchers from MIT and UC Berkeley

I was thinking, could China handle nuclear power just like it could handle so many other things? Why not start churning out tiny nuclear reactors on production lines and exporting them around the world like iPhones and MacBooks?

Can't we bring one back to Berkeley?

But what I found out was a little different

All the presentations were very exciting and promising. China has various nuclear reactors under development.

Some of us got excited during the presentation about the thorium reactor.

As the presentation progressed to the scheduling part, they said, "We will complete the thorium molten salt reactor and have it ready for sale to the world by 2040."

I thought, "Huh?"

(Laughter) I looked at my colleague and said, "Excuse me, can you speed it up a bit?

because we are in the midst of a climate crisis right now.

Above all, pollution in Chinese cities is serious.”

And the response goes something like this: "I don't know what you know about our thorium program, but we don't have a third of the budget, and the U.S. Department of Energy isn't cooperating, even though we know all the data from the reactors we're testing."

I said, "Well, I have an idea.

It will take 10 years to show that the reactor is operational.

Let's skip that process and commercialize it directly.

It will save you time and money.”

The engineers just looked at me and said, "I have a question. Would you buy a car that had never been tested?"

What about other reactors?

There's a nuclear reactor in production that's about to be sold.

high temperature gas furnace

No core meltdown

But it's very big, and that's why it's safe, so no one thinks it's going to be cheaper than today's nuclear reactors.

Using nuclear waste as fuel is a really good idea, but we still don't know how to do it.

There's also the danger of creating more waste, and many people think that if you take the waste into consideration, the overall cost of the reactor will only increase, and you'll just add more complexity.

In fact, the real question is how much are you willing to actually do it?

We went to India and asked about the nuclear reactor program.

The Indian government said ahead of the Paris Climate Conference that it would put about 30 new nuclear reactors into operation.

But when we went to India and asked people and looked at internal documents, they said they were going to run about five reactors.

And in most countries around the world, especially in the wealthier ones, building new nuclear reactors isn't even a topic.

We're talking about decommissioning, before the end of the life of the equipment.

In fact, Germany is putting pressure on its neighbors to decommission their reactors.

As I said for the United States, half of the reactors could be lost in the next 15 years, which would cancel out 40 percent of the CO2 emissions reductions that the clean electrification program is supposed to achieve.

Of course, in Japan, all nuclear reactors have been shut down, replaced by coal, natural gas and oil, and only about one-third to two-thirds are about to be restarted.

So when we scrutinized the numbers and added them up, how many reactors would come online in China and India over the next 15 years, and how many reactors could be shut down? This was the most surprising discovery.

What has become clear is that the world is at risk of losing more than four times as much clean energy as it has lost over the last decade.

In other words, we are not in the clean energy revolution, we are in the clean energy crisis.

It's understandable that engineers are looking for technical solutions to the fear people have about nuclear power.

But considering that it's a very difficult problem, and one that will take a long time to solve, it raises another question: Do technological solutions really work on people's fears?

Think about safety

So no matter what people think, it's hard to figure out how to make nuclear power safer.

If you look in any medical journal -- and this is a recent study published in the highly respected British medical journal "The Lancet" -- nuclear power is the safest way to generate stable electricity.

everyone is afraid of accidents

So let's look at the data from the Fukushima and Chernobyl accidents, and the World Health Organization has found a common denominator: the vast majority of casualties are caused by people panicking. They panic because they're scared.

In other words, it's not really the machine or the radiation that causes the damage.

our fears cause

What about waste?

Everyone Worries About Waste

The interesting thing about waste is how little it is.

From one reactor, that's all

If you were to collect all the nuclear waste that has been produced in the United States, you could fit it in a single soccer field, and stack it up, and it would be about six meters.

They say it's harmful to people and that it affects people.

not so much

On the other hand, unmanaged waste from energy production, called "environmental pollution," kills as many as seven million people a year, and can contribute to global warming at very serious levels.

The truth is, even if we're doing a good job of using this waste as fuel, there's always some fuel left over.

So, even though we think the actual waste won't be much of a problem, there will always be people who think it's a big problem for reasons that are largely irrelevant.

what about weapons

Perhaps the most surprising thing is that no country that has nuclear power has ever decided, "Yes, let's use this as a weapon."

It actually works in the opposite direction.

The only way to get rid of the vast numbers of nuclear weapons is to use nuclear reactors to fuel the plutonium used in nuclear warheads.

And if you want the world to be free of nuclear weapons, we're going to need more nuclear power plants.

(Applause) As I was returning from China, the engineer who took Bill Gates to China stopped me and said, "Michael, it's great that you know all the different nuclear power supply technologies.

In other words, we can build a production line and produce more and more nuclear reactors, but we know how to make them cheaply, but there aren't enough people who want them."

So let's tackle solar and wind power, and increase efficiency and save money.

Let's advance the development of new nuclear reactors

I think we should triple the money we spend on development.

But I think the most important issue, if we're going to overcome the climate crisis, is to remember that the cause of the clean energy crisis isn't our equipment, it's our problem.

thank you

(applause)

It's about a man out there who looks a little like actor Idris Elba, at least 20 years ago.

I don't know anything else, the man risked himself to save my life.

He saved me by running four lanes across the highway in the middle of the night, after an accident that I could have died in.

I was really upset by what happened, of course, but it also left me with a burning passion. I need to know why he did what he did, what made him choose to be my lifesaver, risk his own life to save the lives of strangers.

In other words, I want to know the source of the power of altruism in people like him.

Let me tell you what happened first.

That night, I was 19 years old, and I was driving home in Tacoma, Washington, on Highway 5 when a little dog jumped out of the car ahead of me.

I did something I shouldn't have done.

I realized why I shouldn't

I ended up running over a dog, which caused the car to skid and then spun on the highway until I ended up in the passing lane, facing the car behind me, and the engine died.

In that moment, I knew I was going to die too, but I didn't, thanks to the actions of that brave man. When he saw my car stuck, he must have made the decision in a fraction of a second.

Then he fixed my car, put me back in safe condition, made sure I was okay, and drove off.

Without even giving my name, I'm sure I forgot to say thank you

So before we get to the point, let me take this opportunity to say thank you to that stranger.

(Applause) I tell you this story because I can almost say that what happened that night changed my life.

I became a psychology researcher, working to understand the human capacity to care for others.

Where does it come from? How does it develop? How does it manifest itself in extreme cases?

Questions like these are very important for understanding fundamental aspects of human social nature.

A lot of people, from philosophers and economists to ordinary people, all believe that human nature is fundamentally selfish, and in fact, it only cares about its own happiness.

But if that's true, why do some people, like the man who saved me, put themselves in great danger to help others so selflessly?

To answer this, we need to explore the nature of extraordinary altruistic behavior and what makes the people who engage in these behaviors different from other people.

Until recently, there was very little research on this.

What the man who saved me did was altruism in the strictest sense, a voluntary and costly act driven by a desire to help others.

It is a selfless act that benefits only others.

How can this behavior be explained?

One answer, of course, is compassion, a key component of altruism.

But the question is, why do some people have it more than others?

The possible answer is that the brains of highly altruistic people are fundamentally different.

To figure out what the difference is, I started from the opposite side, looking at psychopaths.

A common way to understand basic aspects of human nature, such as the desire to help others, is to study people who lack that willingness, and psychopaths are a perfect fit.

Psychopathy is a developmental disorder that is strongly genetically predisposed to develop a cold, unsympathetic personality and a propensity for antisocial and violent behavior.

Once, with colleagues at the National Institute of Mental Health, I did the first study to look at brain imaging of psychopathic young people, and the results of that study, and what other researchers now show, is that psychopaths fairly reliably display three characteristics.

First, they are generally not incapable of understanding other people's emotions, but they are unable to perceive the signs that others are in trouble.

It's especially difficult to perceive frightened expressions like this one.

A frightened look conveys urgency and emotional distress, and usually inspires compassion and a desire to help in those who see it, so it makes sense that people who tend to be less compassionate are also desensitized to these signs.

The most important part of the brain for recognizing frightened expressions is called the amygdala.

In very rare cases, when the amygdala is completely absent, there is a significant impairment in the ability to perceive frightened facial expressions.

In healthy adults and children, the amygdala is often highly activated when frightened facial expressions are seen, whereas in psychopaths the amygdala is less responsive to these expressions.

In some cases, they don't respond at all, which may be why facial cues are so hard to notice.

In addition, psychopaths' amygdala is 18 to 20 percent smaller than average.

These findings are reliable, robust, and very interesting.

But my main interest wasn't in figuring out why we don't care about other people.

It is the clarification of the reason to care

So the important question is, since it's the opposite of a psychopath in compassion and a desire to help others, does extraordinary altruism come from the opposite type of brain?

Could it be that the "anti-psychopathic" brain is more capable of recognizing fear in others, that the amygdala responds more strongly to frightened facial expressions, and is larger than average?

My research has shown that all three of these things are true.

For this discovery, we looked at some truly extraordinary altruistic people.

People who donated one of their kidneys to a complete stranger.

People I've never met, and I never will ever meet, who were so seriously ill that they willingly underwent major surgery to remove their own healthy kidneys so that they could be transplanted to other people.

"Why would you do that?" That's a common question.

A possible answer is that there are features in the brains of people who are exceptionally altruistic.

they perceive fear in others more deeply

really sensitive to people in need

One reason is that their amygdala responds more strongly to facial expressions.

That's the same part of a psychopath's brain that's hard to respond to.

In addition, their amygdala is about 8 percent larger than average.

Taken together, the data show that there is something of a continuum of compassion in the world, with people who are highly psychopathic at one end and people who are full of compassion and driven to extreme altruism at the other end.

But it's not just that exceptionally altruistic people are significantly different than they are above average.

That's true, but what really sets them apart is that they don't just direct their acts of kindness and altruism to the people closest to them, like their family and friends.

It's nothing special to be kind to someone you love or feel close to.

A truly exceptional altruist's compassion goes far beyond that, even beyond the boundaries of acquaintances, to people who are completely outside the world they belong in -- complete strangers, like the man who saved me.

I've had the opportunity to ask a number of altruistic kidney donors how they manage to generate that wide-ranging compassion that motivates them to give their own kidneys to complete strangers.

It seems that it was a really difficult question for them to answer.

I asked him, "Why are you willing to do this when so many others don't?

Fewer than 2,000 Americans have donated a kidney to someone else, and you're one of them.

What makes you so special? ”

what was the answer?

the answer is "nothing"

"Nothing special

I am the same as everyone else."

In fact, I think there's a lot to be said about that answer.

no center

Altruists don't see themselves as the center of anything, as superior to others, or as important in the first place.

When I asked one altruist why donating a kidney was warranted, he said, "Because it's not about me."

Another replied, "I'm no different, I'm not special.

Research results will come out that I'm the same person as you."

Perhaps the best description for this astonishing lack of self-centeredness is humility, the quality that Augustine used to describe humans as angels.

what is the reason

If there was no center in the world around us, there would be no inner or outer ring, and no comparison of the value of directing our care and compassion between one person and another.

I think this is exactly what separates the extraordinary altruist from the average person.

But there are a lot of people who can have this worldview, and I think most people can have it.

Because at the societal level, altruism and compassion are already spreading.

As psychologist Steven Pinker and others have shown, people around the world are becoming more and more vulnerable to the suffering of others, leading to a decline in cruelty and violence of all kinds, from animal cruelty and domestic violence to the death penalty.

It leads to an increase in all kinds of altruistic behavior.

A hundred years ago it would have seemed silly, but today it's commonplace for people to donate blood or bone marrow to strangers.

A hundred years from now, will donating a kidney to another person be as common and uncommon as donating blood or bone marrow is today?

it's possible

Where are the roots of these wonderful changes?

Apparently, it's about expanding wealth and improving living standards.

As societies become more prosperous and live better, people seem to start to turn their attention outside themselves, which in turn leads to more altruistic acts towards others, from volunteering and donations to kidney donations.

But these changes also have a strange and contradictory effect: the world is becoming better, more humane, and yet it's true, there's a widespread misconception that it's getting worse and more miserable.

I don't know exactly why, but I think it's probably because we now know much more about the suffering of others far away, and worry more about it.

What is clear is that the changes that are taking place show that the roots of altruism and compassion are just as much a part of human nature as cruelty and violence, and they may even prevail.

thank you

(applause)

what is your salary

don't say it out loud

just imagine the numbers in your head

So how much do you think the person sitting next to you is making?

Don't say this either

(Laughter) So, how much do you think the people who work side by side in your office are paid?

Do you know?

What should I know?

I feel uncomfortable even asking this question.

But the truth is, you all want to know.

Normally, you would think that you would open up about your salary, wouldn't you?

It's not something to spread around the neighborhood, and it's out of the question to tell your colleagues at work.

Because they think that if we find out each other's salaries, we're going to be in big trouble.

Arguments and disputes may erupt, and some may resign.

But what if those conflicts arise because we keep them secret?

What would happen if we took away this secret?

What if openness increased the sense of fairness and collaboration within the company?

What would happen if you made your salary public?

Over the last few years, I've been studying corporate leaders who are questioning traditional management practices.

This salary issue comes up constantly.

And the conclusion always surprises me.

The idea of ​​transparency in pay, which is to say that making pay publicly available internally, is a better place to work for both the employee and the organization.

If you don't know how your salary compares to what your peers are making, it's easy to feel underpaid or even discriminated against.

Would you like to work in a workplace where employees feel unfair treatment or discrimination but don't know?

But that's what it means to keep your pay secret. It's a time-honored practice that's ubiquitous, even though the law in the United States gives workers the right to talk about their pay.

There's a famous story from nearly a hundred years ago, when the executives of Vanity Fair magazine circulated a document entitled, "Don't Discuss Salary Between Employees."

I forbid you to talk about your salary.

It seems that not everyone agrees

Writers from New York, Dorothy Parker, Robert Benchley, Robert Sherwood, everyone at the Algonquin Round Table stood up for transparency, and when they showed up at work the next day, they had a bill around their neck with their salary on it.

(laughs) Can you imagine? At work, I write my salary down on my chest for everyone to see.

But why would a company want to keep their salaries private?

Why do some people follow, while others oppose it like this?

In addition to the often-cited reasons, keeping your salary secret can actually save you a lot of money.

Keeping your salary secret creates what economics calls "information asymmetry."

So at the negotiating table, one side will have the most information by far.

So companies can use this ignorance to save a lot of money when negotiating hiring, promotions and pay raises.

I'm sure you all would find it easier to negotiate a raise if you knew what other people were making.

In economics, information asymmetries lead to market failure.

If someone left their payslips in the photocopier, the workplace would be in big trouble.

In fact, economists even say that information asymmetries can lead to complete market failure.

we are one step ahead

Why do you think that? First, most people don't know how their salary compares to their peers.

In a 2015 survey of 70,000 office workers, two-thirds of those receiving market salaries said they felt they were underpaid.

And 60 percent of those who feel they're being paid too little say they're considering a career change, whether they're actually paying less or more than the market.

What would you have said in this survey?

Is your salary too low?

But wait a minute, how do you know? You can't talk about salary at work, can you?

Also, the asymmetry of information, the secrecy of salaries, makes it easier to eliminate the discrimination that exists in today's marketplace.

A 2011 report by the Institute for Women's Policy found that the gender pay gap was 23 percent.

That's where the "77 cents on the dollar" story comes from.

In the federal government, on the other hand, where salaries are grade-based and everyone knows what they're getting paid, the gender pay gap has narrowed to 11 percent.

If we really want to close the gender pay gap, maybe we should start making salaries public.

If this is a complete failure of the market, disclosure of salaries is the only way to ensure fairness.

It can be awkward to know how much you make, but perhaps it's even more uncomfortable to wonder if you're being discriminated against, or if your wife, daughter, or sister are being paid too little.

Openness is the best way to ensure fairness, and disclosure of salaries can do that.

That's why corporate leaders have been working to make salaries public for years.

For example Dane Atkinson

He was a serial entrepreneur who started a number of companies where the salaries of his employees weren't disclosed, and took advantage of those terms to vary salaries significantly for people with similar qualifications, depending on their bargaining power.

But Dane realized that this created conflict.

Our newest company, SumAll, promised from the beginning to disclose the salaries of all its employees.

yielding great results

Various studies have shown that when employees know how their own salary is determined and how it compares to the salaries of their peers, they work harder, are more engaged, and are less likely to turn over to improve performance.

That's why not only Dane

From tech startups like Buffer to Whole Foods Market, which has tens of thousands of employees, they're not only making salaries public, but also making store and department performance visible to everyone on their intranet.

There are many ways to make pay transparent.

There is no one-size-fits-all method

Some companies disclose their salaries outside the company

There are places where you can stay inside the company

There are also places that publish salary calculation formulas or create salary tables so that you can understand your salary by grade.

Employees wear them at work, without having to make a pay tag

I don't feel lonely at work and don't wear homemade tags

There's a lot you can do to make payroll transparent.

If you have the authority to move your organization towards transparency, please do so.

If you don't have that authority, stand up for your rights.

What is your salary?

How do you compare to your colleagues?

you should know

so does my colleague

thank you

(applause)

When I opened Mott Hall Bridges Academy in 2010, my goal was simple: open schools and close prisons.

Some called it an ambitious goal, because the school was located in the Brownsville neighborhood of Brooklyn, one of the most underserved and violent neighborhoods in New York City.

Like many urban schools with high poverty rates, there are myriad challenges, such as finding teachers who can empathize with the complexities inherent in underprivileged communities, a lack of funding for technology, a lack of parental interest in children, and neighborhood gangs recruiting even fourth-graders.

That's where I opened a district-appointed public middle school, and I became principal, but at first there were only 45 children.

30% of students had special needs

86% were below grade level in language and math

And 100% lived below the poverty level.

How can these children learn without coming to school?

And if they don't learn, what will their future be?

When I asked a 13-year-old boy, the answer was clear: "You -- where do you see yourself in five years?"

The student's answer is, "I don't know if I'll survive until then."

When I spoke to a girl student, she told me that working at a fast food restaurant was her life's goal.

I couldn't accept it

At the same time, it was clear that students didn't realize that there were vast opportunities outside their own neighborhoods.

We call our students "students" because they are lifelong learners.

The skills our students learned today will prepare them for college and employment.

The reason I chose the noble colors of purple and black as my school colors is to remind my students that they are the descendants of greats and that through education they can and will become future engineers, scientists, entrepreneurs and world leaders.

So far, we've graduated three classes, and we have a 98 percent — (applause) 98 percent graduation rate.

Nearly 200 graduates go on to some of the best high schools in New York City.

(Applause) One cold day in January, our student Vidal Shastanet met Brandon Stanton, the creator of the popular blog Humans of New York.

Brandon posted his story, although Vidal, who's from Brownsville, has seen violence up close and witnessed a man being pushed off a rooftop.

And even then, he wrote, he was inspired by a principal who opened a school that trusted all children.

Vidal represents the story of many underprivileged children struggling to survive, and that's why we must make education a priority.

Brandon's articles have had a global impact and touched the lives of millions.

As a result, we raised $1.4 million in donations that enabled students to visit colleges, attend summer science, arts and math courses, and receive college scholarships.

What I want you to understand is that when 200 students from Brownsville visited Harvard University, they knew it was really possible to choose their own college.

And growing up in a disadvantaged neighborhood turned what seemed like an impossibility into hope and purpose.

There's an educational revolution going on in schools, and it's about loving, disciplined, supportive, knowledgeable adults.

That's what makes a child dream

But it's not easy

The education system isn't perfect, but there's a lot to be desired.

But I have a dynamic group of educators working together as a team to identify the best curriculum.

Staff spend time outside of school hours, attend school on weekends, and often spend their own money to obtain textbooks if the school does not have them.

As principal, I need to check my progress on what I want.

That's why I show up in the classroom, observe classes, give feedback, because I want our teachers to be as successful as our school is.

My teachers have access to me every day, and they all have my cell phone number, and I share it with my students and alumni, and that's probably why the calls and texts come at 3 a.m.

(Laughter) It's just that we connect to succeed, and that's what good leaders do.

Tomorrow's future is in our classroom

and we are responsible for them

By "we," I mean everyone here — and everybody looking at the screen right now.

We have a duty to believe in children's extraordinary talents and to teach them to realize the real power of education.

thank you

(applause)

Why bother?

I already know the result

my vote doesn't matter

There are no candidates to choose from

I love voting

I think I've had this thought

You may have said so

Even so, you're not alone, and you're not so wrong

Today, the game of politics is manipulated in many ways.

Otherwise, why does more than half of the federal tax credit go to the richest 5% of Americans?

Yes, sometimes the choices are really bad.

The 2016 presidential election is a prime example of this for many people, regardless of their political affiliation.

But if you look at any year's ballot from top to bottom, you'll find plenty of things to complain about.

But I still think that voting is very important.

As crazy as it sounds, I believe the joy of voting can be revived.

What I want to talk to you about today is how and what it means.

There was a time in American history when voting was a treat, a time when there was more to it than being obligated to go to the polls.

This period can be described as "most of American history."

(Laughter) From the American Revolution to the civil rights era, America had a very active, hyperparticipatory, carnival culture of voting.

Street theater, public debates, fasting, eating, drinking, parades, bonfires, and more

In the 19th century, immigrants and urban polling organizations encouraged this culture of voting.

As new voters were added, this culture evolved.

During post-Civil War Reconstruction, when African Americans began to use their rights as new voters, new citizens, they celebrated with festive parades, which combined "liberation" with "new voting rights."

Yet another few decades later, suffragettes brought the spirit of theater to their own battles, marching in matching white dresses and demanding the right to vote.

And the civil rights movement, which was set aside by Jim Crow laws to restore equal citizenship, put the right to vote in the spotlight.

From Freedom Summer to the Selma Marches, the activists who lived through it all understood how important voting was, and how important it was to display power in order to actually gain power.

But in the last few decades, half a century after Selma and the Voting Rights Act, the culture of face-to-face voting has all but disappeared.

First killed by TV, then the Internet.

Squares replaced by sofas

The screen turned citizens into mere spectators.

It's fine to post politically on social media, but I think it's a pretty quiet civil right.

It's what sociologist Sherry Turkle calls "lonely together."

What we need right now is a voting culture that says, "When we're together, we're together." A culture where voting feels directly, loudly and passionately, not like, "Eat your veggies," or "Do your duty."

Imagine today, across the country, district by district, but nationwide, reviving face-to-face participation and campaigning That such efforts would be made together Outdoor performances that mocked and praised candidates and their causes broadly satirical Street speeches by citizens Public debates in pubs Streets filled with political art, hand-made posters and murals Band concerts where performers representing each candidate competed.

These things might sound a little 18th century, but I'd rather have something as exciting and modern as the Broadway musical "Hamilton."

In fact, millions of people around the world are voting this way right now.

In India, elections are vivid community events.

Brazil has a carnival-like festive mood

In Taiwan and Hong Kong, it's a kind of spectacle, an electoral spectacle that unfolds in the street theatre.

You might ask, who in America has time to do this?

But Americans watch TV an average of five hours a day.

Now you might say, who wants to do it?

Of course there are, citizens who want to know themselves and have their voices heard, not just as advocates and topics, but as participants and creators.

So how do we do it?

just make it happen

So, my colleagues and I started a project called "The Joy of Voting."

In four American cities, Philadel Fair, Miami, Akron, Ohio, and Wichita, Kansas, we bring together artists, activists, educators, politicians, neighbors and the general public to create projects that together build a local voting culture.

In Miami, we had an all-night party with hot DJs who had to be registered to vote.

In Akron, we staged a political drama on the back of a flatbed truck and toured the neighborhood.

In Philadelphia, we had an election-themed scavenger hunt through the old town.

And in Wichita, I made mixtapes and did live street art in the North End to encourage people to go to the polls.

We have about 20 projects, and they're all beautiful and diverse, and they're transforming people.

I would like to introduce some of them

In Miami, we hired a young artist named Atomico to create a vivid, beautiful image for our "I voted" sticker.

But Atomico never voted

I didn't even register

As he created images for stickers, he began to overcome the intimidation he felt about politics.

He registered to vote, he learned a lot about the upcoming election, and on Election Day he wasn't just handing out stickers, he was talking to voters, encouraging people to vote, and talking about the election with everyone.

In Akron, a theater company called Wandering Aesthetics used to put on a variety of plays in the back of flatbed trucks.

To determine the content of their next play, they collected speeches, monologues, dialogues, poems, etc. from members of the public that could be read aloud and performed.

There were dozens of applications

One of them was a poem by nine Hispanic migrant workers taking an ESL (English as a Second Language) class in the nearby Hartville, Ohio area.

I would like to recite part of the poem

Say "The Joy of Voting"

"I want to vote for the first time because things are changing for Hispanics.

I was scared of ghosts

I'm afraid of humans now

Violence and racism are on the rise

voting can change this

There is no such thing as a border wall

just a wall

The wall of shame has a meaning

Vote is the key to breaking down this wall of shame

i have passion in my heart

voting gave me voice and power

Get up and do something

The Joy of Voting project is not just about joy.

It's also about this passion

It's not just the work of an organization, it's about the feelings and beliefs that arise.

All over this country, immigrants, young people, veterans, people of all backgrounds come together to do this kind of passionate, joyful work about elections, whether in states with strong Republicans or Democrats, in cities or in rural areas, people of all political backgrounds.

What they have in common is purely that activity is tied to place.

Remember, all citizenship is rooted in the land.

When politics becomes just a presidential election, we scream and yell at our screens and collapse from exhaustion.

But when politics becomes something where we, our neighbors, our communities come together to gather our voices and our imaginations and create experiences, we're reminded that this really matters.

It reminds me that it's about self-government.

So back to the first question

Why bother?

one answer is this

Voting is important because it is an act of expressing one's own will.

It raises the spirit of mutual concern and revitalizes society.

When we vote, even if anger is our motivation, together we are creatively choosing to believe.

If you vote, you can create the power we want.

It's no coincidence that democracy and theater developed in ancient Athens at the same time.

both pull people out of their shells

Both create rituals that are public and enjoyed by all.

And they both bring that imagination to life, reminding us that human connections are created in our imagination and can be created again and again.

At this moment, when we think about the meaning of imagination, it's fundamentally important, and our ability to take that spirit and think that there's something in the world that's beyond us is not just a matter of technology.

It's not just about making time and knowing the know-how.

this is about the soul

First, to the question, "Why bother?"

Let's step away from psychology for a moment and give a more direct answer.

why should i vote?

because there is no such thing as "not voting"

Not voting is the same as voting for everything you hate and disagree with.

You could say that not voting is passive resistance based on ideology, but not voting is tantamount to actively giving power to people who are against your interests and who are happy to take advantage of your absence.

Not voting is what bad people do

What would this country be like if the people who started the Tea Party movement in 2010 had decided that politics was a mess and voting was complicated?

If there's no chance of our votes accomplishing anything,

They didn't give up before they started

They changed American politics by moving and moving.

What if the supporters of Donald Trump and Bernie Sanders weren't trying to upend the political status quo, and they weren't mobilizing in ways that were unimaginable in old American politics?

they made this possible through voting

The times we live in are divided and sometimes dark, and both the left and the right are clamoring for a revolution, a revolution that destroys everyday democracy.

But everyday democracy has already given us a way to make a revolution.

In the 2012 presidential election, less than 50 percent of young voters, Latino voters, and low-income voters each actually voted.

Voter turnout in the 2014 midterm elections was 36%, the lowest in 70 years.

And voter turnout in district elections is about 20 percent.

I want you to imagine 100%

Picture 100% in your head

If 100% of people move, revolution will happen overnight.

Overnight, our country's policies can change dramatically, and governments at all levels can become responsive to the voices of their citizens.

What should I do to move 100% of people?

First, we have to stop the movement that's happening all over the country that's making it harder to vote.

At the same time, we must work to create a voting culture that people want to participate in and want to come together and experience together.

you have to make a purpose

you have to create joy

Yes, let's create that revolution, a revolution of spirit, thought, policy and participation, a revolution against political mistrust, a revolution against the sense of helplessness we create.

Let's vote for this revolution and have fun while doing it.

thank you

(applause)

Alexios Komnenos This Byzantine emperor led his army to cross swords with the Scythian hordes.

On this occasion, for good luck, he carried one of Christianity's most sacred relics: the veil of the Virgin Mary.

But unfortunately it didn't pay off

His army was defeated, and during the retreat the emperor was stabbed in the buttocks.

To make matters worse, the strong wind made the relic feel heavy, so he hid it in the bushes as he fled.

Still, he escaped and managed to kill some Scythians and save some of his comrades at the same time.

However, this is the story of Anna, daughter of Alexios, who wrote it almost 60 years after the battle.

She spent the last decade of her long life writing the 500-page history of her father's reign, Alexias.

Written in Greek, Alexias followed the format of ancient Greek epics and history books.

But Anna also faced a different and more daunting task than those of ancient writers. As a princess writing a history book about her own relatives, she had to balance her loyalty to her relatives against her duty to accurately describe what happened, even embarrassing events such as Alexios' blow to the buttocks.

A lifelong study and participation in my father's rule prepared me well to take on this challenge.

Anna was born in 1083, shortly after her father took control of the Roman Empire after nearly a decade of brutal civil war and rebellion.

When he first came to power, the empire was in a state of decline, facing foreign threats from all sides: the Turkic Seljuks to the east, the Normans to the west, and the Scythian raiding groups to the north.

Throughout Anna's childhood and adolescence, Alexios led relentless military campaigns and even made the decision to forge an uneasy alliance with the Crusaders to protect the borders of the Empire.

Meanwhile, Anna in Constantinople was also fighting.

Although she was expected to study subjects such as rituals and the Bible, which would be appropriate for a Byzantine princess, her areas of interest were Greek mythology and philosophy.

In order to read mythological and philosophical material, she had to learn to read and speak ancient Greek in secret at night.

Finally, Anna's parents realized how serious she was and got her a tutor.

Anna broadened her horizons, studying classical literature, rhetoric, history, philosophy, mathematics, astronomy and medicine.

Some scholars even complained that their eyes were tired from Anna's endless questions about Aristotle's commentary.

At the age of 15, Anna married Nicephorus Bryennios in order to settle an old feud between the two families and strengthen Alexios' reign.

Luckily, Anna and Nikephoros became friends who shared a variety of intellectual interests, and brought together and debated some of the brightest scholars of their time.

Around that time, Alexios' military campaign began to have consequences, as he succeeded in regaining much of the empire's lost territory.

As her father grew older, Anna joined her husband in helping her parents with their governing duties.

During this time, Anna reportedly demanded that those competing with the power of the state be treated fairly.

After Alexios' death, Anna's younger brother Johannes came to power, and Anna returned to philosophy and scholarship.

Anna's husband wrote a history book claiming that his grandfather could have made a better emperor than Alexios, but Anna disputed this.

I set about writing "Alexias," to examine my father's achievements as emperor.

Set in the Byzantine Empire in the late 11th and early 12th centuries, Alexias depicts the turmoil during Alexios' reign and Anna's own reaction to the turmoil, including bursting into tears over the deaths of her parents and husband.

Perhaps behind such an emotional passage is the hope that it will be read more in a society where the norm is that women should not write about warfare, empire, and so on.

While her loyalty to her father was evident in her high regard for his reign, she did not forget to include criticism and her own thoughts on various events.

After Anna's death, her Alexias continued to be transcribed for centuries, and to this day remains of great value as a contemporary testimony to Alexios' reign.

And with her epic historical accounts, Anna Komnena made her own mark in history.

I remember the first time I went to a fancy restaurant, it was an upscale restaurant.

It was an interview dinner hosted by a law firm, and the waitress walked around before the meal and asked if I wanted a glass of wine, and I said, "Of course."

She immediately said, "I have Sauvignon Blanc and Chardonnay."

At that moment, the thought that crossed my mind was, "Don't use fancy French. Anyway, give me white wine."

But I used my powers of reasoning, and it dawned on me that Chardonnay and Sauvignon Blanc are two types of white wine, and I said, "Chardonnay, please."

In my first few years at Yale Law School, I experienced a lot of this because I looked like everyone else, but I was a cultural outsider.

I'm not from the elite

I'm not from the northeastern east coast or from San Francisco.

My hometown is a steel town in southern Ohio, a place plagued with social problems, a place that epitomizes the problems of the working class in America.

Heroin is infiltrating and killing a lot of people, including people I know.

Family disputes Domestic violence Divorce is tearing families apart

A pessimistic mood pervades society.

When you think about the rising mortality rates in these areas, and realize that for many of the people living in these conditions, the immediate problem is the direct cause of the increased mortality rates in the area, the problem becomes more pressing.

I grew up witnessing such conflicts

My family has lived with that struggle for many years.

my family is not rich

The addiction that polluted the community also polluted my family, and sadly my mother was one of the victims.

At home, I faced a lot of problems, some of which were due to lack of money, other times of lack of people, materials, and relationship-based support, which had a huge impact on my life.

If you looked at my 14-year-old life and thought, "What will happen to this child in the future?"

You would have come to the conclusion that you struggled with what scholars call "elevation."

Ascendancy is an abstract term, but it has a profound impact on the heart of the "American Dream."

Elevation is a consciousness, and a child like me, who grew up in poverty, can decide whether he or she can get out of it and have a better life, whether they can have a better life, or whether they will be able to live more economically, or whether they will stay in the same situation.

Unfortunately, what's been documented is that upward migration in this country hasn't progressed as much as we'd hoped, and interestingly, it varies from region to region.

Take Utah for example

Poor kids in Utah are actually not that bad, they have a very good chance of living the American Dream.

But where I grew up, in the South, in Appalachia, in Southern Ohio, the odds of getting out of poverty are slim.

The American dream in these regions is really just a dream.

What causes this?

The first is the economic or structural cause.

imagine these areas

The economic dynamics surrounding industries like coal and steel are terrible, making it difficult for people to improve.

I'm sure that's one reason

Brain drain is also a problem, where the best people leave their hometowns because there are no high-skilled jobs.

Many schools in these areas have failed, failing to provide educational support for children and hindering future opportunities.

All of these factors are important, and I'm not going to take these structural barriers lightly.

But when I look back at my upbringing and the environment I grew up in, something else happened, and that was also important.

Measuring the impact is difficult, but it's just as real.

First of all, there was an immense sense of disappointment in my community.

Children assume their choices are meaningless

It's a feeling of hopelessness that no matter what happens, no matter how hard you try and how motivated you are to improve, it's not going to turn out well.

It's a tough environment for a child to grow up in.

It's very hard to change those beliefs, and beliefs sometimes lead to suspicion.

Take, for example, the hotly debated political issue of affirmative action.

Affirmative action is divided on political views as to whether it is a smart way to encourage diversity in the workplace and classroom.

Growing up in an area like this, it's easy to think that affirmative action is something that depresses the people who live there.

Especially if you're white, working class.

This measure is not just a question of good or bad policy.

They see it as a conspiracy by people with political and financial power to undermine them.

There are many conspiracy theories about affirmative action, both real and imaginary, that distort our hopes for the future.

If you grew up in that kind of world and thought about what you should do, there are likely two answers.

The first is "Don't study hard. No matter how hard you try, the result will be the same."

Another way to answer is, "Don't look for generic standards of success, like a college education or a top-notch job. People who care about those standards are in a different situation than you.

Why can't they accept me?"

When I got accepted to Yale, my family asked me, "Did you pretend to be a liberal to get through the admissions board?"

this is a true story

Of course, the college application didn't have any check boxes for liberals, but it's a very real feeling of unease about the need to disguise yourself in order to cross social barriers in these communities.

this is an important issue

Even if you don't get depressed, say, that your choices matter, that you want to make the right choices, and you want to improve for your family and yourself, in the environment that I grew up in, sometimes I don't even know what my options are in the first place.

For example, I didn't even know that to be a lawyer, you had to go to law school.

I also didn't know that elite colleges are cheaper for low-income kids, as research has shown, because the big schools attract more donations and can provide more financial aid.

I first learned about this when I received a financial aid offer from Yale University, and it said tens of thousands of dollars in "income-based aid."

As I held the letter in my hand, I said to my aunt, "This is the first time in my life that being poor has helped me so much."

I didn't get that information because the social networks around me didn't get that information.

I learned to shoot a gun and shoot well from the community.

I also learned how to make really good biscuits.

By the way, the trick is to use frozen butter, not room temperature.

But they didn't teach me how to be successful in society.

I didn't learn to make good judgments about education and future possibilities, what it takes to seize opportunities in this 21st century knowledge economy.

Economists call the value we derive from our personal relationships, our friends, our colleagues and our family, "social capital."

It was clear to me that my social capital would not work in 21st-century American society.

There's another factor that's very important, and it's still going on, and it's a taboo in the community, but it's a real issue.

In other words, working-class children are much more likely to experience "adversity childhood experiences" -- or "traumas," for that matter -- repeatedly beaten by their parents, yelled at, abused, witnessed their parents being abused, drug addiction, alcohol abuse.

All of these are examples of childhood trauma, which happened a lot in my family.

More importantly, the trauma that was happening at home wasn't just about the present.

It's been passed down for generations

My grandparents, when their children were born, naturally intended to raise them conscientiously.

They were both middle-class and worked in steel mills, earning a decent income.

But in the end, they inflicted a lot of trauma on their children, trauma that lasts for generations.

When my mother was 12, she witnessed my grandmother set my grandfather on fire.

My grandfather's crime was coming home drunk, and my grandmother warned me, "If you come home drunk, I'll kill you."

and did so

Imagine what impact it would have on a child.

It might seem like a rare occurrence, but in fact, according to a study by the Wisconsin Children's Trust Fund, 40 percent of low-income children experienced multiple traumas, compared to just 29 percent of high-income children.

think about what this means

If you're a low-income child, about half of you will experience trauma at least once.

this is not rare

it's a very serious problem

You can predict the life of a child who has had such an experience.

They're much more likely to take drugs, be far more likely to go to prison, be much more likely to drop out of high school, and even more worryingly, they'll be much more likely to repeat what they've experienced in their own children.

This trauma and domestic turmoil is one of the worst burdens our culture leaves on our children, and it carries on.

When you combine all of these factors -- despair, discouragement, pessimism about the future -- childhood trauma, lack of social capital -- you can see why, at 14, I was on the verge of becoming one of those kids who succumbed to adversity as part of the statistics.

But something unexpected happened

I overcame adversity

I got a chance

I finished high school, I finished college, I went to law school, and now I have a satisfying job.

What triggered it?

The first factor is the presence of my grandparents, who set people on fire and changed their behavior around the time I was born.

They provided me with a stable home environment and a family.

When parents couldn't do what they needed to do for their children, they always reached out and did their part.

My grandmother in particular did two things that made sense.

First, they created a peaceful home environment where I could focus on my studies and what I needed to do as a child.

And that's not all, my grandmother didn't even have a secondary education, but she was very sharp.

I was aware of the messages that the community was sending to me, that my choices were meaningless and that I was at a disadvantage.

My grandmother once said, "Jadee, don't be a loser who thinks you're unlucky.

'Cause I can do whatever I want

Of course, she herself recognized the injustice in the world.

It's a difficult balancing act to tell a child that life is unfair, but also to convince him that his choices matter.

But Grandma managed to balance it out.

Another thing that helped me was the United States Marine Corps.

It's commonly known as part of the U.S. Armed Forces, and of course it is, but for me, the Marine Corps was a four-year, character-building crash course, like making a bed and doing the laundry.

waking up early in the morning managing your money

What I didn't learn from my community

When I went to buy a car for the first time, the dealer recommended me an "ultra-low interest rate" of 21.9%, and I almost signed the contract.

In the end, I refused, because I consulted with an officer, and he said, "You're an idiot, go to the local credit union and get a better deal."

I did what I was told

Unless you're in the Marine Corps, you don't get that kind of knowledge.

To put it bluntly, the finances would have collapsed.

The last thing I want to say is this: I have been blessed with mentors and people who have played an important role in my life.

From the Marine Corps to Ohio State University to Yale University and elsewhere, people reached out to make sure that I had the social capital that I clearly lacked.

It was lucky for me, but there are many children who don't get that kind of luck.

We need to ask how we provide a warm home for low-income children born into broken homes.

We need to ask how we teach low-income parents how to have better relationships with their children and their spouses.

We need to ask how we provide social capital and leadership to low-income children who are not benefiting from it.

We need to ask working-class children not only how to teach knowledge and skills like reading and math, but how to teach social skills like conflict resolution and financial management.

i don't know all the answers

I don't know all the ways to solve the problem, but I do know that at this moment in Southern Ohio, a kid anxiously waits for his father to come home, and when he opens the door, he's sober, drunk and staggered.

A child goes unconscious after his mother sticks a needle in his arm and goes to bed hungry, not knowing why his mother isn't cooking him dinner.

A child has no hope for the future, but desperately wants a better life.

I just want every child to lead a better life.

I don't know all the answers, but I do know that if we don't ask more meaningful questions about why I was so lucky and how to bring this good fortune to more communities and to the children of this country, this gloom will go on forever.

thank you

(applause)

this is "bop"

Bop is one of the styles of popular dance.

Dance is a language, and popular dance is a community expression.

Popular dance is not choreographed by a specific person.

I can't pinpoint the origin

Each dance style has its own set of steps, but the point is that the individual is free to express their identity.

That's why popular dance changes and spreads so quickly.

Its history goes back as far as human memory can remember.

If you look at African-American popular dance in the United States, you can see the impact that traditions with African roots have had on history for more than 200 years.

the present always includes the past

Our past shapes who we are today and our future.

(Applause) The "Juba Dance" was born out of the experiences of African slaves on plantations.

It's a dance that African slaves who were brought to the Americas and deprived of a common language danced to remember their homeland.

I think it was like this at the time

Pounding their thighs, shuffling their feet, and clapping their hands, in this way they evaded their master's ban on drumming and improvised complex rhythms, which is exactly what their ancestors did with drums in Haiti and the Yoruba of West Africa.

The meaning of this dance was to perpetuate a cultural tradition, to keep a sense of freedom in mind while being captive.

There's also a dance born out of this spirit of subverting control: the "cakewalk," a satirical way of behavior that was characteristic of Southern high society. It was one of the ways slaves openly mocked their masters.

What's interesting about the cakewalk is that it's a slave dance for his master, who has no doubt that he's being ridiculed.

Now this might look familiar

Born in the 1920s — "Charleston"

Charleston was all about improvisation and musicality, and from there evolved "Lindy Hop," "Swingdance," and "Kid and Play"—originally called "Funky Charleston."

Born in a tight-knit black community near Charleston, South Carolina, Charleston took the dance hall by storm, and suddenly young women had the freedom to lift their heels, kick their feet, and dance.

The essence of popular dance is community and connection, and knowing certain steps meant being part of a certain group.

But what if this becomes a global fad?

Let's go to "Twist"

It's no surprise that the twist's history dates back to the 19th century, when it was brought to America from the Congo during slavery.

But in the late '50s, just before the civil rights movement, the twist was made famous by Chubby Checker and Dick Clark.

All of a sudden, everyone started dancing the Twist, whether it was white teenagers or Latin American children, and the Twist began to appear in music and movies.

Through popular dance, the boundaries between groups are fading away.

This trend continued in the 80's and 90's.

With the advent of "hip-hop," African popular dance in the United States gained more attention, a long history that shapes and is shaped by culture.

Today, these dances continue to evolve, grow and spread.

why do we dance

To move my body, to release myself, to express myself.

why do we dance together

To be healed, to reminisce about the past, to make a statement: "We speak a common language.

It certainly exists and is free."

I'm going to drag you down the drain, or even down the sewer, because I want to talk about diarrhea.

I want to talk specifically about diarrhea design.

When evolutionary biologists talk about design, they're talking about design by natural selection.

That's where the title of the talk comes from, "On the intelligent design of pathogenic bacteria using evolution."

I pretended to be a clever person and added a subtitle [Darwin in the Land of Mud]

But it wasn't just about looking good.

Because I thought the subtitle could express how a Darwinian like me sees my role in the health sciences and medicine.

Not a Friendly Field for Evolutionary Biologists

It's a field with tremendous potential, but many people try to protect their turf, and even if new ideas are proposed, there will be fierce criticism.

I want to talk to you today about two general issues.

First, why are some pathogens more harmful than others?

The other is a closely related problem.

Can pathogenic organisms be made less toxic?

As I said earlier, let's start by talking about diarrhea pathogens.

The point of this story, and the point common to other pathogens that cause acute infectious diseases, is to look at the problem from a bacterial perspective.

In particular, it's about thinking about the fundamental part, that there's a huge variability in the virulence of pathogens.

The idea is, looking at it from the bacteria's point of view, pathogens need to move from one host to another, and often the host needs to be healthy in order to move from one host to another.

just not always sometimes independent of host mobility

May be infected with pathogens

In such cases, evolution teaches that natural selection chooses the more exploitative, predator-like organisms.

So natural selection chooses the organisms that do more harm.

If migrating between hosts requires host locomotion, the winner of the race is likely to be a gentle bacterium.

So if pathogens don't need hosts to be healthy and active, natural selection will choose pathogens that take advantage of the hosts, and the winners in the struggle will be the organisms that exploit the hosts for their own reproduction.

Conversely, if pathogen infection requires host motility, the less harmful pathogen will be the winner.

Let's apply the above ideas to diarrhea symptoms.

Diarrhea-causing organisms infect in three basic ways

It can be transmitted through human-to-human contact, it can also be transmitted through human-food-to-human contact, it can also be transmitted through ingestion of contaminated food or through water.

When transmitted through water, unlike the other two routes of transmission, the pathogen does not need to rely on a healthy host.

It can infect dozens, even hundreds, of people while the host is lying on the bed.

I'm going to show you what this diagram is.

They wash the contaminants with water and the water can flow into drinking water sources.

People will come to collect that contaminated drinking water, and maybe they'll bring it back to their families, and they'll all drink it.

The point is that even those who cannot move can spread the infection to many people.

According to evolutionary theory, we can assume that when diarrheagenic bacteria are water-borne, they become more predatory and more harmful.

there is a way to check this

One way to do this is to look at all the diarrheagenic bacteria and see if some bacteria, which are mainly transmitted through water, are more dangerous than others.

The answer is – it is.

I'm putting the names out there for you bacteria fans, but anyway, the point here is -- (Laughter) yeah, there's a lot of them, isn't there -- the point here is that all the data show a very strong, positive correlation between the rate of waterborne transmission of diarrheagenic organisms and the toxicity, the lethality rate if left untreated.

This suggests that we are in agreement

But here I thought I needed to pursue some more questions.

Now, remember the second problem I mentioned at the beginning, which is how, given this reality, how can we mitigate pathogenic organisms?

If we go by this story, we might be able to shift pathogenic organisms from the right side of this graph to the left side by preventing drinking-water borne infections.

but it is not clear how long it will take

Because if it takes thousands of years, it has no value as a pathogen control.

If it can be done in just a few years, it's an important way to get under control of a daunting problem that was previously out of control.

In other words, this suggests that we tame the bacteria.

May evolve to be less harmful

When I was thinking about these things, I noticed a bacterium called Vibrio El Tor cholera.

This is the bacterium that causes cholera.

I think it's the best organism to study because it's clear why it's harmful.

That's because bacteria produce toxins, and these toxins are released when bacteria enter our intestinal tract.

Toxin flushes water from the cells lining the surface of the intestine into the lumen, which is the interior of the intestine, and follows the flow to the exit.

When it does, it also flushes out thousands of other competing bacteria that are a nuisance to Vibrio.

What this means is that when this organism enters the body, it produces a large amount of toxins.

After a few days of being infected, you will have less dirty feces than you thought.

Feels like muddy water

If you look at a drop of that water, you'll find a million diarrheal bacteria.

If they were producing a lot of poison, the numbers would be ten to one hundred million.

If they weren't producing as much toxins, there would be fewer bacteria.

So our challenge is to see if we can evolve to mitigate the virulence of the bacterium by preventing drinking-water borne transmission and restricting the transmission route to person-to-person contact or person-food-person.

I can think of some experiments

One is to prepare various strains of this bacterium, strains that produce a lot of toxins and strains that produce less toxins, and try to spread them around the world.

Water-borne infections will not occur in countries with clean water supplies, where they will evolve to be less harmful.

In countries where water-borne infections are prevalent, one would expect this organism to evolve in a highly virulent direction.

There are some ethical issues with this experiment.

I was hoping to hear you all upset

this worries me a little

(Laughter) Laughter made me feel a little better.

This is a big ethical issue

In other words, it's something like

there is a dying girl

Rehydration therapy helped her recover, and within a few days she was a different person.

I don't want to run this experiment.

But interestingly, that's exactly what happened.

In 1991, cholera bacteria landed in Lima, Peru, and within two months it spread to neighboring areas.

I don't know how it happened I had nothing to do with it I promise

I don't think anyone was involved, but if it happened, I wouldn't hesitate to see if my predictions were correct.

Has the virulence of cholera that evolved in a country like Chile, which has one of the best water systems in Latin America, eased?

Did bacteria evolve to be highly toxic in places such as Ecuador where water supply facilities are inadequate?

In the case of Peru, it was in the middle.

With the support of the Bosak Kruger Foundation, I obtained bacterial strains from those countries and measured the toxins they produced.

If you look at the Chilean strain -- the strain that spread in Peru and invaded Chile in the space of two months -- you can see that on the far left of the graph, there's a wide variation in the amount of toxins produced.

Each dot corresponds to a different human island, and natural selection is at work in many ways.

What's interesting about this is that if you look back in the 1990s, in just a few years, this bacterium has evolved in a way that's calmed down.

Evolving in a direction that produces less toxins

I want you to realize how important this is. In 1995, Chile reported an average of only one case of cholera every two years.

So it's controlled

This is the endemic number of cholera in the Americas, and it doesn't seem like a problem.

In Chile the problem has been solved

But before we get overconfident, let's look to other nations to make sure that this creature isn't just evolving to soften.

Peru is

And Ecuador -- the country with the highest potential for water-borne infections -- seems to have evolved to be more harmful.

There is great variability in every country, and something about the environment in which they live -- the only realistic explanation is probably the degree of transmission through drinking water -- and that difference would have produced virulent strains in some places and less virulent strains in others.

That's a very encouraging result, because it shows that you can do something with the money, and that you're getting more out of your money.

We can evolve an organism in a less toxic way, which means that even if it does infect humans, it will infect weaker strains.

does not develop serious symptoms

And another important point here is that if we can control the evolution of virulence -- the evolution of virulence -- we should be able to control antibiotic resistance.

the idea is very simple

Infections with harmful bacteria lead to large numbers of people showing symptoms, and large numbers of them taking antibiotics.

Given the many stimuli that build antibiotic resistance, bacteria become more virulent and evolve in a direction that increases antibiotic resistance.

Once antibiotic resistance develops, it becomes ineffective against harmful strains of bacteria.

resulting in higher levels of virulence

A vicious circle is born

The goal is to turn this around.

If cleaning water supplies can evolutionarily reduce virulence, it should also evolutionarily reduce antibiotic resistance.

Let's take another look at the countries we've come across

Could Chile avoid the problem of antibiotic resistance, and would Ecuador have a problem?

In the early 1990s, we see a large variation.

This y-axis shows antibiotic susceptibility, but I'm not going to get into the details.

Antibiotic susceptibility is highly variable in Chile, Peru and Ecuador, with no trends seen

But if you look just five years later, in the late 1990s, you can see that Ecuador is starting to have problems with antibiotic resistance.

Antibiotic susceptibility is decreasing

Chile still has antibiotic susceptibility

Chile seems to have avoided two problems

Bacteria have evolved in harmless ways, and antibiotic resistance has not emerged.

These ideas can be applied in any direction, as long as we can figure out what caused bacteria to evolve destructively.

Now that we've touched on malaria a little bit, I'd like to share another example.

The next example I want to give you, or the question you want to address, is how can we evolutionarily soften the malaria parasite.

Malaria is transmitted by mosquitoes, and people who get sick from malaria usually become more susceptible to mosquito bites.

Just by looking at historical data, we know that vector-borne diseases are more severe than non-vector-borne diseases.

There's a very interesting example of an experiment that shows this in action.

In the case of water-borne infections, we can improve the sanitation of the water system and see if the bacteria evolve in a way that pacifies them.

In case of malaria, provide mosquito-proof housing

I have a little more detailed reasoning.

If you have a mosquito-proofed home and you're sick and you're lying in bed -- or you're lying in a mosquito-proofed hospital bed, the mosquitoes can't come into contact with you.

Harmful pathogens are the losers in a mosquito-free environment.

The only pathogens that can spread are those that are weak enough that the infected host can still go out and be bitten by mosquitoes.

So if you treat your home with mosquito repellants, you should be able to evolve less virulent pathogens.

An excellent experiment has been conducted to support the immediate implementation of this measure.

It's an experiment that was conducted in northern Alabama.

To give you a little background, the star is located in Louisville, Kentucky, the center of knowledge in America.

This amazing experiment was carried out by the Tennessee Valley Authority in Louisville, 200 miles south of here in northern Alabama.

They dammed the Tennessee River

We stopped the flow of water, we needed hydroelectric power.

Stagnant water breeds mosquitoes

In the late 1930s, ten years after the dam was built, people in northern Alabama were found to be infected with malaria, and between one-third and one-half of the population had malaria.

Here are some dam locations

And this puts the Tennessee Valley Authority in a stalemate.

At that time there was no DDT or chloroquine. What should I do?

I've decided to apply mosquito repellent to every home in northern Alabama.

They divided northern Alabama into 11 zones and spent three years spending $100 per house to give every home mosquito repellent.

here is the data

Each column represents 11 zones

An asterisk indicates when the mosquito repellent treatment is complete.

So what we're seeing here is that malaria was eradicated by mosquito repellent treatment alone.

This was introduced in "Boyd's Malaria Studies," an excellent malaria textbook published in 1949.

But most malaria experts don't even know this book exists.

This is important data, because if mosquito bites are moderate, you can eradicate malaria by making your home mosquito-proof.

It should be implemented in many other areas as well.

Well, for example, sub-Saharan malaria areas.

In areas like Nigeria, where mosquito bites are common, eradication is unlikely.

It's in those areas that we should take advantage of evolution to mitigate toxicity.

That's the experiment I've been waiting for, and if the prediction is proven, it means we have a powerful weapon in our hands.

In some ways, it's much more powerful than the weapons we use today, such as anti-malarial drugs.

So, yes, it's great to have antimalarial drugs available in bulk at low cost, but we know that when they're used in bulk, they in turn develop resistance to the drugs.

It's just a short-term solution

Here's the long-term solution

What I'm advocating here is that instead of just tackling the evolution of pathogens as a problem, as in the case of anti-malarial drugs, let's explore the possibility that evolution can steer us in the direction we want.

If you look at this table, you'll see that I've only introduced two examples so far.

As I said earlier, these theories should work for any infectious disease.

Because dealing with infectious diseases is dealing with biological systems.

Working with biological systems means working with evolutionary systems.

If you do something to the system, it will evolve in some way.

What I'm saying is that we need to know how evolution works at that time, so we need to know how evolution works so that we can make optimal interventions, such as making pathogens evolve the way we want them to.

I don't have time to go into all these details, but I wanted to show you that there really are ways to control the evolution of the virulence of some of the most formidable pathogens we've ever faced.

All of this is related to other ideas that have been discussed so far today.

For example, the earlier discussion about how to reduce the sexual transmission of HIV.

It's important to understand how things work.

Will improving local economies reduce infections?

Interventions such as being sincere with your partner may reduce transmission.

Anyway, what matters is how to reduce it, because reducing infection means changing the way the virus evolves.

The data shows that we're evolving the virus in a way that mitigates it.

And by figuring out how it works, control becomes more efficient.

What's great about this idea, apart from the fact that it adds a new dimension to the study of disease control, is that in many cases, the treatments that are better done, and the treatments that are supposed to be done, are the treatments that everyone wants to do, regardless of the outcome.

It's just that we haven't been able to justify the cost yet.

I mean something like this

It means that if we know that a clean water supply will have additional benefits, and if it actually solves the problem, then we can all say, let's move in that direction.

Thank you

(applause)

I recently visited the New Guinea Highlands and spoke with a man who had three wives.

When asked, "How many wives would you ideally have?"

There was a long silence, and I started to imagine, "Five?

Or 10 people?

Or 25 people? ”

The man brought his face closer to me and muttered, "0 people."

(Laughter) 86 percent of human societies allow more than one wife, polygamy.

But in the overwhelming majority of cultures, only 5% to 10% of people actually have multiple wives.

Having multiple partners can be a headache

In fact, sometimes wives fight each other and even poison each other's children.

In the first place, you can't build a harem unless you own a lot of cows and goats, a lot of money and a lot of land.

Humans are a mating species

Ninety-seven percent of mammals don't marry to raise children, but humans do.

But I'm not saying that we humans are necessarily chaste and honest.

We've looked at "infidelity" in 42 cultures and found that it has some genetic and brain circuitry explanations.

It's a very common act all over the world, but people are made to love each other.

So, how is "love" changed by technology?

My answer is "Almost no change"

study the brain

My colleagues and I have done more than 100 brain scans -- happy people who have just fallen in love, people who have just been dumped by a loved one, and people who have been in love for a long time.

By the way, it is possible for the state of "being in love" to last for a long time.

I've long argued that humans have developed three distinct brain functions for mating and reproduction: sexual desire, intense romantic feelings, and the deep, natural affection that arises for long-term partners.

Together, these three functions, along with other areas of the brain, govern your sex life, your love life, and your home life.

But these mechanisms lie much deeper than the cortex of the brain, the limbic system, where we feel and generate emotions.

It's the most primitive part of the brain, related to energy, focus, craving, motivation, desire, drive.

The drive, in this case, is to achieve one of life's greatest goals: the acquisition of a mate.

These mechanisms were built by human ancestors over 4.4 million years.It doesn't change even if you swipe left or right on the screen on a dating app.

(Laughter) (Applause) There's no question that technology is changing the face of dating. Texting, texting, using emojis to express emotions, sending naughty texts, liking people's photos and selfies.

There are new rules and taboos about dating.

But is this actually changing the shape of love itself dramatically?

What about in the 1940s, when automobiles became so ubiquitous, all of a sudden we had mobile bedrooms.

(Laughter) What about the arrival of birth control pills?

In the past, we lived side by side with the fear that if we were unmarried and got pregnant, we would be criticized by the public.

"Love" hasn't changed even with dating sites

I've been Match.com's Chief Scientific Advisor for 11 years.

What I keep saying, and the company agrees with, is that dating sites are about introductions, not relationships.

When you walk into a bar, take a seat at a coffee shop, or sit on a park bench, your primordial brain suddenly wakes up, like a sleeping cat, and you smile, laugh, listen attentively, repeating the path our ancestors did 100,000 years ago.

There are many different types of people you can meet on the site.It's the same on any dating site.But the most important algorithm is only in the human brain.

Technology won't change this

And technology won't change the choice of who to fall in love with.

In my research into the biology of personality traits, I've come to the conclusion that there are four main types of thinking and behavioral patterns that have evolved over human evolution, related to the dopamine, serotonin, testosterone, and estrogen secretory systems.

So, I created a research questionnaire, inspired by brain science, to assess how strong the traits that reflect each of these four secretory systems, or the clusters of traits that are in the same system.

We put this survey up on dating sites all over the place, and we surveyed 40 countries.

So far, we've collected responses from over 14 million people, and we've been able to see who is naturally attracted to whom.

So what we've found is that dopamine-dominant people tend to be curious, creative, free-spirited, and active.

Curious and creative people need like-minded people.

Serotonin-dominant people tend to be traditional, conservative, rule-abiding, authoritarian, and religious.

In that sense, similar people are attracted to each other.

In the case of the remaining two types, opposite poles are attracted to each other

A testosterone-dominant person likes to be analytical, logical, outspoken, decisive, and seeks the opposite type of person: estrogen-dominant, excellent conversational skills, excellent interpersonal skills, highly intuitive, kind and expressive.

So there's a natural pattern to choosing a mate.

Modern technology won't change who you choose

But I'm particularly interested in one trend that technology has created recently.

It's related to the concept of the "paradox of choice."

For millions of years, humans lived in small groups of hunter-gatherers.

There was no chance to choose from 1,000 potential partners on dating sites.

In fact, recent research suggests that there may be an ideal number of choices for the brain. We don't know what that number is, but apparently, we know from vast amounts of data that humans can comfortably handle between five and nine options, but if you go beyond that, you'll experience what the academic term is "cognitive overload," and you won't be able to choose any of them.

This leads me to the theory that this cognitive overload is responsible for the emergence of a new form of dating, which I call "slow love."

I came up with this idea through my work at Match.com.

There, for the past six years, we've conducted a survey every year called "American Singles."

It's aimed at US citizens, not users of the site.

We've chosen more than 5,000 people based on the Census to be representative of Americans.

We've now collected data from over 30,000 people, and year after year, we see some of the same patterns.

Each year, more than half of respondents say they've had a one-night stand—not just in the past year, but ever—and half say they've had sex friends at some point in the past, and more than half say they've lived together for a long time before getting married.

It's an act that in America would be considered imprudent.

I've long suspected it's not, because it tends to be too strong.

There must be an evolutionary explanation, and I don't think there are many people who are that ignorant.

Then, by chance, I came across a statistic that made a lot of sense.

It was a very interesting academic paper, and it showed that 67 percent of single people in the United States today, who have long-term cohabiting partners, are not married because they are afraid of divorce.

Because they worry about the social, legal, emotional and financial consequences of divorce.

I am convinced that this does not come from carelessness, but rather prudence.

Modern singles want to know everything about their partner before they finish.

In bed, you know a lot of things, not just how to love, but whether you're kind, whether you're willing to listen.

(Laughter) Surrounded by so many options, the threat of pregnancy and sexually transmitted diseases is infinitesimal, and there is no shame in premarital sex, I think modern people have taken the time to love others.

In fact, what's happening in modern society is the lengthening of the stage before the promise of a lifetime.

Marriage used to be the beginning of a relationship, but now marriage is the finale.

But the human brain... (Laughter) It's always been the brain, and in fact, in America today, 86 percent of the population is married by the age of 49.

Even in other parts of the world where marriage isn't as popular, people eventually find a long-term partner and settle down.

Then it occurred to me that by spending a long time before committing to a lifetime of love, we ended unsuccessful relationships before we got married, and that's why we're seeing more and more successful marriages.

So we asked 1,100 married couples in the United States -- not on Match.com, of course -- to answer a bunch of questions.

One of them was, "Do you want to marry your current partner again?"

81% answered yes to this

In fact, the biggest difference between modern love and family life isn't technology.

not even slow love

It's actually the number of women who are entering the labor market all over the world.

For millions of years, our ancestors lived in small groups of hunter-gatherers.

It was the women's job to find and collect fruits and vegetables.

Between 60% and 80% of the dinner was food collected in this way by women.

In principle, both of us worked

At that time, women were seen as equal to men economically, socially, and sexually.

But about 10,000 years ago, the environment changed. Humans began to farm and settle, and both men and women had to marry the right people: people of the right background, people of the same religious affiliation, people of the right social and political connections, of the right lineage.

Men's work became more important, carrying stones, cutting trees, plowing fields.

It's your job to bring your produce to market and bring back the earnings.

Along with this change came stereotypes, such as that a mate should be a virgin, that marriage should be decided by the parents, that the man should be the head of the household, that the wife should be chosen by the parents, that the wife should live in the home, and most importantly, the vow that "I will always honor my husband until death do us part."

All of these are now outdated ideas.

It's becoming obsolete, and in many countries it's already an obsolete notion.

There is a revolution in marriage

Humans are abandoning their 10,000-year-old farming traditions and transitioning to male-female relationships that treat both sexes equally.

I'm not a hyper-optimist, there's a lot to worry about in the world.

I've studied divorce in 80 cultures, infidelity in many cultures, and the problems are many.

In the words of the poet William B. Yeats, "Love is a perverse thing."

If I add it in my own way, "No one made it out alive."

(Laughter) Everyone has problems.

But the poet Randall Jarrell put it really well.

"In the dark and uncertain world of family life, the brightest fail and the humblest succeed."

But in the end, it's love and affection that win, and this is something that technology can't change.

To conclude, when we think about relationships, we must always keep in mind the most powerful determinant of human behavior: never-satisfying, ever-changing, and above all, the most fundamental human need: love.

thank you

(Applause) (Kelly Stetzel) Thank you.

As you know, we have another speaker on the floor in the same field.

Esther Perel approaching this topic from a different perspective

I'm a psychotherapist for couples.

Your specialty is data, but Esther studies the stories she hears from couples who come to counseling.

let's show up

Estelle please

(Applause) Now, after watching Esther Helen's talk, if there's anything that resonates with you from your own perspective, please comment.

Estelle Perel: It's a funny story, because everywhere in the world, everybody wants love.

On the other hand, there's a fundamental shift taking place in the rules of how we love, how we interpret love, and how men and women should interact.

The traditional model of marriage largely revolved around various obligations and obligations, loyalties to one another and demands of the community.

Now it's transformed into a model of free choice, individual rights, self-sufficiency and the pursuit of happiness.

So my first thought was that people still want love, but the way it's positioned and what it's supposed to be in a romantic relationship is going to change a lot.

Speaking of the paradox of choice, on the one hand, having so many options makes us feel fresh and playful.

At the same time, on the other hand, as you mentioned cognitive overload, so many people come to me.

With so many options out there, you're stuck in a state of uncertainty and lack of confidence, FOMO. Fear of Missed Opportunity.

A condition that I call "stable ambiguity" began to occur.

This is what happens when you're afraid to be alone, but you don't feel like you're willing to build intimacy.

It refers to a series of strategies that prolong the uncertainty of not only the future of the relationship between two people, but also whether or not they will break up.

In the world of the Internet, there are three main types

First, cryopreservation and low-heat heat preservation. These are two great ways to put a relationship on hold. They create a kind of hold that makes the relationship more ambiguous, but at the same time leaves a nice amount of comfort and plenty of freedom in the black and white.

(laughs) Do you understand?

The ending is "no communication"

What this is all about is that you don't have to deal with the pain you're inflicting on others by abruptly disappearing after a series of interactions, because you're making it invisible even to yourself.

(laughs) You know what?

As I listened to your story, these words came to mind. It's also said that reality is shaped by vocabulary.At the same time, here's the question.Do you think that the essence of love does not change even if the surrounding environment changes?

You study the brain, and I study relationships and circumstances.

But how much the surrounding environment has changed...

So if the environment changes, and the meaning of the relationship between men and women changes, do the needs change there, or are the needs independent of the surrounding environment?

(Helen Fisher) Wow (Laughter) (Applause) Well, three points.

First of all, what you said at the beginning is, of course, that things are different now than they were then, and modern people want people to love them.

In fact, in a survey I do with 5,000 people each year, I ask them what they want.

Year after year, more than 97% of respondents said this... (Estelle) Are the conditions increasing? (Helen) No. In summary, 97% of the respondents

They say they want someone who respects them, who they can trust and can talk openly about, who makes them laugh, who spends enough time with them, and who they like how they look.

This condition is the same every year

And, of course, there are two aspects of... Estelle: I understand the phenomenon.

It wasn't like that in the old days. (Helen) Exactly.

(Estelle) In the past, the conditions were someone to accompany me, support me financially, and have a baby together.

It's about moving from a production economy to a service economy.

(Laughter) It's a phenomenon that's happening at the global economy level, and it's happening in marriage as well.

HH: No doubt about it, but the funny thing is that millennials actually tend to aspire to be good parents.

On the other hand, when you're a generation older, you have higher ideals for marriage, but you're not as interested in being a good parent.

You can see these differences everywhere

Personality traits fall into two broad categories: one is the cultural dimension, the behaviors and beliefs that are cultivated from childhood, and the other is the attitude of the person.

What I've been talking about is basically attitude.

People's attitudes will certainly change as times change and common sense changes.

When it comes to the paradox of choice, it's definitely a tricky situation.

For millions of years, humans have repeatedly jumped into the water, fascinated by the beautiful boy reflected on the surface of the water.

(Estelle) But... (Helen) Just one more thing.

In the first place, in hunter-gatherer societies, it was common to have two or three partners throughout a lifetime.

I wasn't stiff

I'm not telling you to imitate that, but the point is that there was always a replacement.

In fact, the brain is so well-functioning that it tries to make decisions through a function called "balancing," "to go, to quit, to leave, to stay."

"What are the chances?"

"How should we deal with this?"

I think that this function of the brain is reflected in the behavior of modern people.

(Kelly) Thank you

Both of you will have countless invitations to dinner tonight!

(Thank you for applause

take another look at the world

I'd like to show you some of Ben Henning's maps of the Earth, probably in a way most of you have never seen the Earth.

This image looks familiar

I was born before this image was taken

My first word was "moon," and I suspect my mother conveniently fantasized that I saw the moon as a baby on the flickering screen of a black-and-white TV.

It's only been a few centuries since we began to think of the Earth as a sphere.

In the 1960s, when images like this came out, the world was changing at an incredible rate.

In my humble knowledge of human geography, a cartographer named Waldo Tobler drew a new map of the world, and it went viral, and I'm going to show you one of them.

This world map may look a little strange

On this map, the heavily populated areas are drawn large, and the sparsely populated areas, such as the Sahara and the Himalayas, are smaller and disappear.

Space is allocated equally to people all over the world.

the city shines bright

The lines drawn are submarine cables and trade routes.

And then there's the line from the Chinese port of Dalian, through Singapore, through the Suez Canal, through the Mediterranean Sea, to Rotterdam.

This is the route that, just a year ago, the largest ship in the world carried a container full of goods, and if you had unloaded it and loaded it all onto a truck, the line would have been 100 kilos.

This is how our world is connected.

That's the amount of stuff that one ship can move around the world in just one voyage in five weeks.

We've lived in cities for a long time, but that wasn't the case back then.

This is Catalhüyuk, one of the oldest cities in the world.

In its heyday 9,000 years ago, people had to walk on other people's roofs to get to their own homes.

If you look carefully at a city map, you'll see that there are no streets, because streets are our invention.

the world is changing

Through trial and error

We've slowly and gradually found ways to live better.

And the world is changing incredibly fast, especially these days.

It was only six, seven, eight generations ago that we actually understood that humans are a kind of animal.

It's only in the last couple of decades that maps like this have been drawn.

This map also shows the world's population, with arrows showing how humans spread out of Africa, and when they might have reached a certain point.

I have to redraw this map every few months, for someone to discover that the time was wrong.

We are learning about ourselves at incredible speed.

we are changing

Many changes are slow

It is the accumulation

We don't notice the change, because lifespans are short, 70 or 80 years, or 90 years if you're lucky.

This graph shows the annual growth rate of the world's population.

By 1850, the rate of increase was very low, but the rate of population growth started to rise, the rate of population growth began to rise, and by the time I was born, by the time we were able to see images from the Moon for the first time, the Earth's population was growing by two percent each year.

If population growth continues at this rate of 2 percent a year, in just a few more centuries, the entire planet will be overrun with people, and they'll all be cohesive.

population growth

I was afraid, and in 1968 the book "Population Explosion" fueled the fear.

But if you look at the end of the graph, that increase is slowing.

Over the last decade - 70's 80's 90's 2000's population growth has been slower this decade.

the earth is stabilizing

By the end of this century, it's trending towards 9, 10, 11 billion people.

Confusion can be seen in change

I see World War II

You can see the 1918 flu epidemic.

I can see the great famine in China

Incidents like this draw attention

We tend to focus on terrible events in the news.

We pay less attention to gradual changes and good news.

we care about humans

worry about the population

I wonder how I can be alone

But here's a map of the world, drawn so that the sparsely populated areas look wider.

If you want to know a place with few people, this place is the best place

Every year these regions are expanding, because globally, people are moving out of the countryside.

move to the city

living more densely

Wolves are back in Europe, moving westward across the continent.

the world is changing

I have some worries

This is a map showing where it rains on the planet.

I recently found out that

You can see where Çatalhüyük was, where the three continents of Africa, Asia, and Europe meet, and you can see a lot of people living in an area with very little water.

You can also see areas with very high rainfall

You can also do more advanced maps

Instead of having the map shaped by humans, we could have the map shaped by water, or we could change the map monthly based on the amount of rain that falls on every corner of the earth.

We can also see the monsoon movements on Earth, as if the Earth had a heartbeat.

It's only in the times I live in that this view is possible.

we have enough water

This is a map of where we grow crops in the world.

These are the areas that we mainly rely on to grow rice and grains.

Some people worry about food shortages in the future, but if we eat less meat, we can feed less crops to our livestock. As long as we all think we belong to the same group, there will be enough food for everyone.

I've also come to realize that we are doing very bad things today.

Have you ever seen this world map?

So here's a map based on satellite photography. Remember, in the first slide I showed you, the view of the Earth from around the moon, a map of what the Earth looks like at night.

When you see a map like this, you'd think it's a normal map that we're used to seeing, showing where people live.

The places that are usually lit are where people live.

But remember, this image of the world is a stretched map.

This map has the same population density everywhere.

Areas without people are shrunk until they disappear.

It's drawn to represent people equally.

People are everywhere, so the light no longer shows where people are.

The lights on the map are the lights of London, the lights of Cairo, the lights of Tokyo, the lights of the eastern coastal regions of the United States, where energy is wasted enough for satellites to create images like this, and where people live and who can afford it enough to make the skies glow with electricity.

The dark areas on the map are the areas where electricity is not readily available, or where electricity is available but has learned to stop wasting electricity.

If you turn this map into a continuous video in chronological order, you'll see that Tokyo has gone dark, and since the tsunami, Japan has shut down its nuclear power plants and saved a quarter of its electricity.

not the end of the world

it just shines with less light

There is a lot of good news in the world

Infant mortality is rapidly declining at an incredible rate.

A few years ago, the number of babies dying before the age of one year fell by 5 percent in just one year.

More children are going to school, learning to read and write, being online, going to college, and more women than men are going to college around the world.

There's a lot of good news that the planet is getting better and better, but we tend to focus on the short-term bad news.

I think the philosopher Rebecca Solnit puts it so beautifully that imperceptible, slow changes are transforming our time into something very different from the past. The past was much more stable.

Sometimes bad things happen

Every night on TV you get terrible news.

There are no reports of slowing population growth.

It doesn't teach us that the world is gradually becoming connected

about the wonderful improvements in our understanding of technology,

We don't even hear that we waste and consume less.

this is the last map

We erased the ocean from this map

What you're looking at now is a map drawn by percentage of the world's population of 7.4 billion.

China has over a billion people and you see it has the biggest city in the world, but you don't know the name of the city.

I see India at the center of the world

I see Europe on the edge

And today in Exeter, England, we're really on the edge of the globe.

We are on a tiny piece of rock off the coast of Europe, which makes up less than 1% of the world's adults and less than 0.5% of the world's children.

We live in an increasingly stable world, an increasingly urbanized world, an aging society, a connected world.

There are so many things to be afraid of, but we don't really need to be afraid of each other. We have to understand that we live in a new world now.

thank you

(applause)

I'm going to talk to you about a faulty intuition that many of us have.

More precisely, it means failing to detect certain dangers.

The scenario I'm about to describe is, in my opinion, both terrifying and plausible. It's an unfortunate combination.

And a lot of people think it's nice rather than scary.

I'm going to tell you how artificial intelligence can benefit us and ultimately ruin us.

It's actually hard to imagine a scenario where artificial intelligence doesn't destroy humanity or drive it to self-destruction.

But if you're like me, it's fun to think about those things.

The reaction itself is the problem.

That kind of reaction should be worrisome.

Suppose that what I'm saying in this talk is that global warming or some cataclysm is coming, and that there's going to be a global famine, and that our grandchildren and their grandchildren's generations are going to end up looking like this picture, then you wouldn't think, "Hey, that's funny.

I loved this TED talk."

famine is no fun

On the one hand, doom in science fiction is fun. At this point, my biggest concern about the development of AI is our inability to respond appropriately emotionally to the dangers that lie ahead.

I myself, who speaks like this, cannot react like that.

It's like we're standing in front of two doors.

The first door leads us to stop building intelligent machines.

Advances in hardware and software stop for some reason.

Let's take a moment to think about what could be causing this

Given the value that can be gained from automation and intelligence, humans should continue to advance technology as much as possible.

What would be the reason if it stopped?

all-out nuclear war

A global epidemic

an asteroid collision

Justin Bieber's inauguration

(Laughter) The bottom line is that something has to destroy our current civilization.

Think about how bad that would have to be, to permanently impede the progress of technology for generations.

Arguably the worst event in human history.

Another option, behind the second door, is a future of continuous advances in intelligent machines.

So at some point, we're going to build machines that are smarter than humans, and once machines are built that are smarter than humans, they're going to evolve on their own.

When that happens, we face the risk of what mathematician I.J. Goode calls an "intelligence explosion," in which the process of progress leaves human hands.

It's often caricatured as the horror of being attacked by hordes of malevolent robots like this one.

But that wouldn't be a very likely scenario.

It's not like the machine wakes up with malice.

What we should really worry about is that if we build machines that are so much better than humans, the slightest misalignment between the goals of humans and machines could doom the human race.

It's good to think of humans as being like ants.

We don't hate ants

I won't go out of my way to crush you

Even take care not to crush it

walk avoiding ants

But when the ants' presence collides with our goals, like building a structure like this, we have no qualms about wiping out the ants.

My concern is that one day we'll build machines that, consciously or unconsciously, treat humanity that way.

I think a lot of people think that they think too much.

Some people question the feasibility of superintelligent AI, let alone believe it to be inevitable.

But then I want you to find fault with the following assumptions.

only three assumptions

Intelligence is information processing in a physical system

Actually this is more than hypothetical

Intelligence, in the narrow sense, is already machine-made, and those machines have already surpassed human levels.

And we know that general intelligence, which is the ability to think flexibly across multiple disciplines, can be composed of matter, because the human brain is.

What we have here is just a bunch of atoms. If we continue to build systems made of atoms that behave more intelligently, unless something interrupts us, one day we'll create general intelligence in machines.

The point is that the speed of progress doesn't matter here, because any progress is enough to get you there.

We don't need the continuation of Moore's Law, we don't need exponential progress.

just keep going

The second assumption is that humans keep going

It's about us continuing to improve our intelligent machines.

Consider the value of intelligence. Intelligence is what we need to protect the things we value, the sources of everything we value, the things we value.

the most valuable resource we have

we need it

we have a problem to solve

I want to cure diseases like Alzheimer's and cancer.

I want to understand how the economy works, I want to make weather science better.

So you should do it if possible

The train has already left the station and there are no brakes.

Third, humans aren't at the top of intelligence, or even near it.

this is an important insight

It's what puts our situation in jeopardy, and it's also why our intuition about risk is so unreliable.

Think about the smartest people in history

One name that almost always comes up is von Neumann.

Neumann was surrounded by some of the most brilliant mathematicians and physicists of his day, and there are many accounts of how people were impressed by Neumann.

Even if Neumann's story is only half right, he is undoubtedly one of the smartest people to ever live.

Consider the distribution of intelligence

here is von neumann

I and you are around here

There are chickens around here

(Laughter) Excuse me, the chicken is around here.

(Laughter) You wouldn't make an already depressing story even more depressing.

(Laughter) I think the distribution of intelligence will be much more expansive than we can imagine today, and if we build machines that are more intelligent than humans, it will push this horizon of intelligence farther than we can even imagine.

What's important is that if you just look at speed, you can be sure.

Let's say we have a superintelligent AI that has the intelligence of your average Stanford or MIT researcher.

An electronic circuit runs a million times faster than a biochemical circuit, which means the machine works a million times faster than the brain that created it.

So if you let it run for a week, that's 20,000 years of human-level intellectual work, week after week.

A brain that makes such progress would be more difficult to comprehend, let alone suppress.

To be honest, I have other concerns, so what is the best-case scenario?

Suppose you come up with a superintelligent AI design that doesn't worry about safety.

I got the perfect design first

Acts exactly as intended, as if divinely given

The machine will be the perfect device to eliminate human labor.

You can design a machine to build a machine that can do any manual labor, run on sunlight, and cost as little as raw materials.

Humans are freed from toil

Even a lot of intellectual work becomes unnecessary.

What would monkeys like us do in such a situation?

Let's play frisbee and massage each other

Add to that LSD and crazy clothes, and the world could turn into a Burning Man festival.

(Laughter) That's all well and good, but think about what might happen in the current political and economic climate.

Economic inequality and unemployment will likely rise on an unprecedented scale.

If we're not willing to provide this new wealth to all mankind immediately, a handful of trillionaires will be on the covers of business magazines while the rest of us will starve.

What will Russia and China do when they hear that a Silicon Valley company is about to deploy superintelligent AI?

The machines are capable of waging war with unprecedented power, whether on the ground or cyber.

It's a winner-takes-all scenario

By being half a year ahead of the competition, you're at least half a million years ahead.

The mere rumor of such a technological breakthrough would set the world in a frenzy.

The thing that scares me the most at this point is the kind of thing AI researchers say to try to reassure you.

Time is often cited as a reason not to worry.

That's a long time ago

50 or 100 years from now

As one researcher said, "Worrying about AI safety is like worrying about overpopulation on Mars."

This is Silicon Valley's version of "Don't bother your little head with that."

(Laughter) What no one seems to realize is that the time scale is irrelevant here.

If the very substance of intelligence is nothing more than information processing, and if humans continue to improve machines, eventually we will create some form of superintelligence.

We have no idea how long it will take to create the conditions to do it safely.

say it again

We have no idea how long it will take to create the conditions to do it safely.

50 years today is not the same as 50 years ago.

This is 50 years in months.

This is the time since the iPhone came out

This is the time since "The Simpsons" began airing.

Fifty years is not a very long time to take on one of humanity's greatest challenges.

Again, we seem to be emotionally incapable of responding appropriately to what we think is bound to come.

Computer scientist Stewart Russell has a good analogy.

Imagine that you received a message from an alien civilization that said, "Ladies of Earth, in 50 years we will be there.

I'm prepared."

Are we just waiting for their mothership to land?

I think you feel a little more urgency.

Another reason to be worry-free is that these machines are extensions of humans and should have the same values ​​as humans.

Connected to our brains, humans become like the limbic system.

I want you to think about it for a moment, but they say that the safest and only sensible way to do it is to implant the technology directly into your brain.

It might actually be the safest and only sensible way to go, but shouldn't security concerns about technology usually be addressed before it's even put into your head?

(Laughter) The deeper issue is that building a superintelligent AI would be easier than perfecting the neuroscience of building a superintelligent AI and integrating it into the human brain.

The countries and companies working on this recognize that they are competing with other countries and companies, and if the winner can take over the whole world -- unless they destroy it the next moment -- in such a situation, whatever is easier will come first.

Unfortunately, I don't have an answer to this question, just a suggestion to think more about it.

I think we need something like the "Manhattan Project" for artificial intelligence.

Not to build it, because that would be inevitable, but to find out how we can avoid becoming like an arms race, and make sure it's built in the best interests of mankind.

Given that a superintelligent AI can change itself, we'll only have one chance to get it right, and then we'll have to accept the political and economic consequences of doing it right.

When we acknowledge that information processing is the source of intelligence -- that it is some sort of computational system that underlies intelligence -- that humankind will continue to improve upon such systems -- and that the horizon of cognition will likely continue farther than we currently know -- then we must admit that we are trying to create a god of sorts.

If you want to make sure that god is someone you can work with, now is the time.

thank you

(applause)

Have you heard of "CRISPR"?

It would be a shock to me if I hadn't heard

It's a technique for genome editing, and it's so versatile and controversial that it's sparking all sorts of really interesting discussions.

Should the woolly mammoth be revived?

Should Human Embryos Be Edited?

And my favorite is this: Can we justify using this technology to completely wipe out species from the face of the earth that are considered harmful to humanity?

This field of science is moving much faster than the regulatory system that governs it.

So for the last six years, I've made it my mission to help as many people as possible understand these technologies and their implications.

CRISPR has become a hot topic in the media, and the most commonly used words are "easy" and "cheap."

So what I'd like to dig a little deeper into is the myths and realities around CRISPR.

If you want to use CRISPR on your genome, you first have to make a scratch on your DNA.

This wound takes the form of cutting both strands of the double helix.

Then the cell's repair process kicks in, and we tell this process not to edit naturally, but to edit it the way we want it.

That's how it works

This system consists of two parts

One is "Cas9 protein" and the other is "guide RNA"

It's like a guided missile

Now, Cas9 -- I like to anthropomorphize Cas9 -- is like Pac-Man trying to nibble on your DNA, and guide RNA is like a lead that keeps Cas9 out of the genome until it finds a match with itself.

Together, these two are called CRISPR.

This system mimics the immune system of ancient bacteria.

The amazing thing is that only 20 bases in the guide RNA define the target.

It's really easy to design and cheap to buy.

It's modular in the system and nothing else changes.

And that makes it a very easy and powerful system.

The guide RNA and the Cas9 protein form a complex, bump around the genome, and when they find a site that matches the guide RNA, they crawl between the two strands of the double helix, pulling the DNA apart and triggering the Cas9 protein to cut it.

what do the cells do?

Invoke initial response system

There are two main restoration processes

The first is to force the cut pieces of DNA back together.

This is not very efficient, because bases can be dropped or added.

It's not a bad way to turn off a gene's function, but it's not very good for genome editing.

Another restoration process is much more interesting.

This repair process requires homologous sites in the DNA

Diploid organisms like humans receive one copy of their genome from their mother and another from their father, so if one is damaged, it can use the other chromosome to repair it.

This is the source of this repair process.

The repair is complete and the genome is back to normal.

To hijack this process, you give them a fake piece of DNA, where the ends of the piece are homologous, but the middle part is different.

This way, you can insert whatever you want in the center and trick the cells.

This allows us to change or delete bases, but most importantly, we can insert new DNA, just like a Trojan horse.

CRISPR is going to be amazing because of the sheer number of different scientific advances that will come out of this technology.

What's special about this technology is that it's a modular targeting system.

We've been pushing DNA into organisms for many years,

It's this modular targeting system that allows us to insert DNA where it's intended.

The only problem is that this technology is being called too cheap and easy.

I run a community lab.

I started getting emails from people saying, "Can you go in the evening when the lab is open and use CRISPR or something to manipulate your own genome?"

(Laughter) I really mean it.

I answer "it's impossible"

(Laughter) "But I heard it's cheap and easy."

Let's consider this point

how cheap is it?

Certainly relatively cheap

The average cost of reagents for an experiment can go from thousands of dollars to hundreds of dollars, and it saves a lot of time.

From weeks to days

this is good

But you still need a specialized lab to work with, and you can't do anything meaningful outside of a professional lab.

Don't take the words "you can do it in the kitchen" seriously.

These studies are not easy.

And on top of that, it's pending patents, so even if you could invent something, you'd be caught up in the epic patent battle between the Broad Institute and UC Berkeley.

It's been really interesting to see how this struggle has unfolded, and we've been accusing each other of false allegations, and we've submitted testimonials like, "Yes, I signed my lab notebook."

Reconciliation will take years

Even with that settlement, there would be huge licensing fees to apply this technology.

Can you say that this is really cheap?

It is basic research to do, and if you have your own laboratory, it will be cheap.

Is it easy? Consider this point

The devil is always in the details

We actually don't know much about cells yet.

it's still a black box

For example, we don't know why some guide RNAs work well and others don't.

We don't even know why some cells take one repair process and others take another.

Besides that, there are problems with getting this system into cells in the first place.

It's not that difficult in a culture dish, but it's very tricky to apply to whole organisms.

If it's something like blood or bone marrow, that's fine, and they're being studied a lot right now.

And there was an amazing story about a young girl with leukemia who was saved by using a technology that predates CRISPR to take her blood and edit the genes in her blood cells back into her body.

We're all going to do research like this.

But right now, if you want to introduce it systemically, you'd have to use a virus.

You put CRISPR into a virus and it infects a cell.

But once you put the virus in your body, you don't know the long-term effects.

In addition, CRISPR has a very small chance of cleaving off-target sites.

What will happen in the long term?

These aren't trivial problems, and there are scientists trying to solve them, and maybe one day they'll be solved.

But it's not immediately available

Can you say that it is easy?

It's easy if you take a few years to figure it out for a particular system.

Yet another problem is that we don't really know how to change specific parts of the genome to get the desired results.

For example, it will be a long time before we know how to make pigs grow wings.

Even if I have to put up with adding one more leg.

Wouldn't it be great if that was possible?

But in reality, CRISPR is being used by thousands of scientists in some of the most important research projects, like using animals to develop better models of disease, taking the process of producing beneficial chemicals and bringing them to industrial scale and using them in fermentation tanks, and even basic research into the role of genes.

This is the CRISPR story we have to tell.

Many scientists have done a lot of work to make CRISPR a reality, and what's interesting to me is that these scientists are supported by our society.

please think about it

Our society has an infrastructure that allows a certain percentage of people to do research all the time.

It's no exaggeration to say that this fact makes us all the inventors and keepers of CRISPR.

we are all responsible

That's why I want you to learn these skills, because only then will you be able to guide the development and use of these technologies in your own hands, and ultimately bring beneficial results to the planet and to us.

thank you

(applause)

When Dorothy was a little girl, she was fascinated by goldfish.

Her father said, ``Fish move their tails in the water.''

Dorothy answered without hesitation, "Yes, Dad, and shake your head and swim backwards."

(Laughter) For her, this was true.

The fish shakes its head and swims backward —

I believed that

Our lives are full of "fish swimming backwards"

we speculate, we make leaps of logic

have preconceptions

think you are right and the other person is wrong

fear the worst

Strive for unattainable perfection

I decide for myself what I can and can't do.

In my mind, the fish swung its head frantically and swam backwards, and I didn't even notice it.

I'm going to tell you five things about me.

one of them is a lie

First, I graduated from Harvard with an honors degree in mathematics at the age of 19.

Second, I currently run a construction company in Orlando.

Third, I appeared in a comedy show on TV.

Fourth, I lost my sight due to a rare genetic disease.

Fifth, worked as a legal clerk for two U.S. Supreme Court justices.

Which lie?

actually it's all true

yes, all five

(Applause) At this moment, most people only care about comedy shows.

(Laughter) Based on my experience, it's more or less the case.

The show was NBC's "Saved by the Bell: The New Class."

I played Weisel, a sly, sly, nerdy character that was incredibly difficult for a 13-year-old me to play.

(Laughter) I'm sure you were wondering if the fourth blindness was real, right?

I wonder why?

We have preconceptions about "disabilities"

I'm blind, so every day I see people making false assumptions about my abilities.

But the point today isn't that I'm blind.

about my heart's eye

I went blind and learned to live with my eyes open

I became aware of the backward-swimming fish that was born in my mind.

I became blind and could see the fish clearly.

What does it feel like to "see"?

Looking is a direct and passive act

I open my eyes and the world is in front of me

"A picture is worth a thousand words" What you see is the truth

don't you

i thought so

But between the ages of 12 and 25, my retina deteriorated rapidly.

My vision was getting stranger and stranger, like a mirror house at an amusement park.

When I was shopping and found a store clerk and approached, it was a mannequin.

When you reach out to wash your hands, what you're touching is not the sink, but the toilet bowl.

I was able to see the image for the first time after asking my friend to explain the picture I had.

The visible was constantly appearing, transforming, and disappearing.

It was difficult and very tiring to watch.

I collected bits and pieces of flashing footage, analyzed clues, and searched for connections in a jumbled kaleidoscope until I saw nothing.

I've learned that what you see isn't universal truth.

it is not an objective reality

What you see is a unique, personal virtual reality that is engineered by your brain.

Let the amateur neuroscience explain

The visual cortex occupies 30% of the brain

By contrast, 8% is tactile, and 2-3% is auditory.

The eye sends two billion visual information every second to the visual cortex of the brain.

All together, there's only a billion pieces of information outside of our eyes.

That's why vision takes up one-third of our brain's capacity and uses two-thirds of our brain's processing power.

It makes sense that the visual illusion is so convincing.

But don't get me wrong, vision is a kind of illusion.

here's where it gets interesting

To create a visual experience, your brain references concepts of the world you perceive, other knowledge and memories, emotions and attention.

All of this, plus many more, are combined in the brain and connected to vision.

This connection works both ways, and usually happens subconsciously.

For example, what we see affects our emotions, and emotions literally change what we see.

It has been revealed in many experiments

For example, if you were asked to guess how fast the man in the video walked, your answer would change depending on whether you were asked to think of a cheetah or a turtle.

Immediately after exercising, hills look steeper, and with a heavy rucksack, your goal appears farther away.

Here we meet a fundamental contradiction

What you see is a complex psychological construct of your own making, but you experience it passively as a direct representation of the world around you.

you create your own reality and believe in it

I believed too, until it broke

With the deterioration of the eyes, the visual illusion collapsed.

Vision is just one way to paint our reality.

We create our own reality in many ways.

Let's take fear as an example.

fear distorts reality

When you get caught up in distorted thinking, anything seems better than the unknown.

Fear tries to fill in the unknown by all means, disguising what it fears as the known, showing the worst in place of the vague, substituting speculation for evidence.

Psychologists have given this a perfect name: Worse.

(Laughter) That's a fitting name.

Fear replaces the unknown with the worst

By the way, fear really comes true.

When faced with a great need to look at yourself objectively, fear retreats into the depths of your being, narrowing and distorting your vision, crushing your ability to think critically with a flood of destructive emotions.

When you have to act, your fear keeps you from acting, and you just watch the prophecies of your fear come true.

When I was told that I had a blinding disease, I was convinced that blindness would be the ruin of my life.

Blindness was the same as the death penalty in terms of independence.

I thought it was impossible to make my dreams come true

What blindness meant was a dull life — a small, sad, and perhaps lonely life.

I believed so

It was just a fiction born out of fear, but I believed it.

It was a lie, but it was real to me, like a backwards-swimming fish in little Dorothy's mind.

If I hadn't fought fear for what it really is, I would have lived that kind of life.

I can confidently say that

So how do we live with our eyes open?

it is learned consciously

you can learn and practice

let me explain very briefly

Take responsibility for every moment, every thought, every little thing

Don't give in to fear and see the reality

be aware of your assumptions

Harness your inner strength

Suppress negative words in your mind

Correct misconceptions about luck and success

Accept your strengths and weaknesses and know the difference

Open your heart to the many blessings that have been given to you

Your fears, your self-criticisms, your heroes, your villains are all your excuses, your quibbles, your shortcuts, your justifications, your capitulations.

They're just fictions that you feel are real.

Let's see the reality without being deceived

throw away the fiction

you are the creator of your reality

Being the creator of reality means taking full responsibility.

I chose to step out of the tunnel of fear into the uncharted world of the unknown.

I chose to build a rich life there.

I was not alone. I share a beautiful life with my beautiful wife, Dorothy, our triplets, whom we call "Trypsky's," and our new family, our lovely baby, Clementine.

what are you afraid of

What lie are you telling yourself?

How do you embellish reality and write fiction?

What reality are you creating for yourself?

In your career, in your private life, in your relationships, and in your heart and soul, a backwards-swimming fish can do a lot of harm.

It hurts you in the form of lost opportunities, closed possibilities, and creates a sense of insecurity and distrust when you're looking for ways to reach your goals and build relationships.

Please find out the fish swimming behind you.

Helen Keller said the only thing worse than blindness is seeing but not having vision.

Being blind was a great blessing to me, because it opened the eyes of my heart.

i want you to see what i see

thank you

(Applause) Bruno Giussani: Isaac I have one question before I leave the stage.

Your audience is entrepreneurs, activists, innovators.

You're the CEO of a company in Florida, and I'm sure many of you are wondering what it's like to be a blind CEO.

What specific challenges did you face and how did you overcome them?

Isaac Lidsky: The hardest part turned out to be a boon.

because you can't see people's reactions

(Laughter) Bruno: What is this laughter? Isaac: So —

Isaac: For example, in an executive meeting, I can't see facial expressions or gestures.

So I learned to ask them to verbalize as much as possible.

I always let people say what they think

And in this regard, as I said earlier, both myself and the company benefit greatly from being able to communicate on a deeper level, avoiding ambiguity, and most importantly, making people aware that what they think has value.

Bruno: Thank you Isaac: Thank you Bruno

(applause)

The language I speak here is on its way to becoming a universal language, for better or worse.

Think about it: it's the language of the internet, it's the language of finance, it's the language of air traffic control, it's the language of pop music, it's the language of diplomacy. English is everywhere.

In fact, more people speak Mandarin than English, but there are more Chinese speakers learning English than English speakers learning Chinese.

I heard the other day that 24 universities in China offer all classes in English.

English is taking over the world

And then there's also the prediction that by the end of the century, almost all of the 6,000 or so languages ​​in existence will no longer be spoken.

They say there are only a few hundred left.

What's more, not only are we now able to translate conversations on the fly, but the quality is improving year by year.

The reason I'm telling you this is because I think it's time to ask yourself this question: Why should I learn a foreign language? Except when English is a foreign language.

We're entering an era where everyone in the world can communicate in one language, so why bother learning another?

There are many reasons, but the first one I'd like to address is the one you've heard the most about, and this reason is much more dangerous than you might think.

The idea is that because thoughts are transmitted through language, learning the vocabulary and grammar of different languages ​​can put everyone on a kind of trip.

It sounds incredibly attractive, but it's actually problematic.

It's not entirely wrong

For example, in French and Spanish, the word for "table" is somehow considered feminine.

You must say ``la table'' and ``la mesa'' with the feminine definite article.

So if you ask someone who speaks French or Spanish to imagine Table "speaking," it's not just a coincidence, and there's a pretty good chance that Table will say that it speaks in a high, female voice.

For French and Spanish people, the table is like a girl, and they have a different perception of it than English speakers.

We all love data like this, and people often say that it's the kind of worldview you can have by speaking a particular language.

But be careful, what if you dispassionately analyzed native English speakers like us?

What is the worldview that comes from English?

Consider the example of an English speaker

Bono is on screen

Bono speaks English, doesn't he?

I think he certainly has a certain worldview.

So this is Donald Trump

He speaks English, too, doesn't he?

(Laughter) This is Kim Kardashian. She also speaks English.

Well, there were three English speakers.

What is the worldview they have in common?

What is the world view that is formed through the language of English that connects the three?

This is a very problematic way of thinking.

The idea that language shapes thinking is becoming more and more popular, but it's often just a vague idea without a solid foundation.

It's not meant to give you a different perspective on the world.

Well then, why learn a foreign language?

If it's not something that changes the way we think, why else would we learn?

there are some

The first reason is that when you want to embrace a culture, to savor it, to be a part of it, whether or not language conveys culture -- which is questionable in itself -- you need to have some degree of mastery of the language in which that culture operates.

I have no choice but to

There's an interesting example that makes this very clear.

I'll have to blur it out a bit, but you'll understand.

It's the story of a film directed by Canadian director Denis Arcand, whose name in English is Dennis Arcand.

In his movie "Jesus of Montreal"

Many of the characters are lively, playful, passionate, funny French-Canadian French-speaking women.

In a scene near the end of the film, these women take a friend to an English-speaking hospital.

You have to speak English in that hospital.

English is spoken, but it's not their mother tongue, so they want to avoid English if possible.

Their English is slow and accented, and their expressions are not natural.

And then a lovable character turns around and looks like a piece of paper, with a dull presence.

When you walk into a culture and see people behind those lace curtains, you never truly understand the culture.

Assuming there are hundreds of languages ​​to survive, one of the reasons we learn them is because language proficiency is your ticket to participate in the culture of the people who speak it, simply because that's their rule.

this is the first reason

The second reason is that, as people often say, being bilingual is less likely to cause dementia and better parallel work.

Because these things are set in at a young age, they can give you a clue as to when you should let your child learn a new language.

It's healthy to use two languages

And third, languages ​​are just fun.

It's a lot more fun than it sounds

In Arabic ``katab'' means ``he wrote'' and ``yaktubu'' means ``he writes'' and ``she writes''.

"Uktub" means "write"

What do these words have in common?

In fact, what they all have in common is a consonant in the middle, like a pillar.

Consonants that don't move even a faint, vowels dancing around them

Anyone would want to move their mouth and pronounce it

It's in Hebrew, and so is Amharic, which is widely spoken in Ethiopia.

it's fun

Moreover, the word order differs from language to language.

Learning to speak with a different word order is like the tingling sensation you get when you drive in a foreign country and drive on the wrong side of the road or apply local herbs around your eyes.

language can do that

So, for example, "The Cat in the Hat Comes Back." It's your favorite book, like "Moby Dick."

There's a line in that book that goes, "Where do you think you found the cat?

where do you think you were I was eating cake in the bath.

I need practice with sentences like "I know where you found the cat?

The cat is definitely chewing on the cake in the bath."

It feels good to say this

It would be nice to be able to enjoy it like this for years and years in a row

Have you ever learned Cambodian?

I don't have one either, but if I could, I'd be able to bleed through my mouth not just the 14 or so English vowels, but more -- well over 30 vowels -- just as smoothly as a Cambodian, like a bee in a hive.

this is the power of language

More to the point, self-studying a foreign language has never been easier than now.

In the old days, you had to go to class, and there are teachers who are hard working and who are geniuses, but they are only there at certain times, so there is a limited amount of time to go to class.

Speaking of language, it was the classroom

If I couldn't do that, I used something called "record."

I used to practice with it

There was a limit to the amount of data that could fit on a single record, whether it was a cassette or the now curiosified "CD".

There were other "books," but they were useless, and that's about it.

Now, you can learn any language on your own while you lie down in your living room, lazing around and sipping whiskey, because there are great resources like the Rosetta Stone.

Although not well known, "Glossika" is also highly recommended.

You can do it anytime, so you can increase the amount and quality of your learning.

You can also enjoy your morning routine in different languages.

Every morning, I play Dilbert in different languages, and it improves my language skills.

Twenty years ago, you couldn't have carried any language you liked in your pocket and got information from your phone, which any intelligent person would have said was science fiction.

I encourage all of you to try learning a language other than the one I speak here. There's never been a better time to learn.

it's a lot of fun

You can't "change" your mind, but I guarantee that you'll find something that will "blow your mind".

thank you

(applause)

Good evening

My journey to this stage began when I came to America at the age of 17.

I'm one of the 84 million Americans who are immigrants or children of immigrants.

Everyone comes to America with a dream, but all too often that dream has to be rewritten and adjusted.

i was lucky

It's allowed me to reimagine my dream and get into the job I have today, helping immigrants run for public office and leading the movement for inclusive democracy.

But I don't want you to think that it was an easy journey, or that America welcomed me with open arms.

still not

I want to share with you some of the things I've learned along the way, because I believe that together we can improve and strengthen American democracy.

I was born in India, the largest democracy in the world, and when I was four years old, my family moved to Belize, probably the smallest democracy in the world.

At 17, I moved to America, the greatest democracy in the world.

I came to the United States to study English literature.

When I was a kid, I read all the books, and I thought I should read books for a living as an adult.

But even after graduating from college with a master's degree, I found myself in a series of jobs that were far from my ideal.

Perhaps because of my optimism about America, it took me some time to realize that things weren't going to change.

The door that I thought was open actually had very little space to get through. This door, America, opens wide to someone with the right name, the right skin color, the right connections, and it can slam right in front of you if you believe in the wrong religion, have the wrong immigration status, the wrong skin color.

I didn't agree with this

So I became a social entrepreneur, and I started an organization for young people like me -- I was young when I started -- who had roots in the Indian subcontinent.

Through this work, I became an advocate for South Asians and immigrants from other parts of the world.

I reached out to members of Congress on policy issues.

On Election Day, I volunteered to do exit polls.

But I didn't have the right to vote, I didn't have the right to stand for election.

In 2000, it was announced that the cost of applying for citizenship would more than double, from $95 to $225, so I decided to apply for citizenship before the cost was out of my reach.

In a long application form, I had to include my past and present friendships.

And after you submit your paperwork, you have fingerprints and tests that require you to study, and you have to wait in line for a long time.

It can also be called over-examination.

And finally, in December of 2000, I joined hundreds of other immigrants in a hall in Brooklyn to pledge allegiance to the country that I had long considered home.

As an international student, it took me 16 years to become an American citizen, which is short compared to other immigrants.

And soon after I officially became an American, the disaster of September 11, 2001, changed the immigration landscape for decades.

New York City, where I live, was in shock and was recovering, and in the midst of that, the election was held.

Two things happened while we were in New York City recovering from the loss.

First, Michael Bloomberg was elected mayor of New York City.

And voters voted to create an immigration policy office in New York City.

Five months after this election, the new mayor of New York City appointed me as the first director of the newly created Office of Immigration Policy.

Let's turn back time a little

I was a young immigrant woman from Belize

After a series of jobs in the United States, he founded an organization rooted in immigrant society in the basement of a church in Queens.

The terrorist attacks of 9/11 had a huge impact on our immigrant society.

My family and the young people I cared for were being harassed at school, at work and at airports.

In the midst of this, I was appointed as the representative to convey these immigrant concerns to the government.

I've never had a job more perfect than this one.

I've learned two things since I became director.

The first is that the good New Yorkers who work in the City Hall as civil servants have no idea how immigrants fear law enforcement.

Many immigrants can't tell the difference between a sheriff, a local police officer, and the FBI.

Also, many immigrants are concerned, if not concerned, when someone in uniform passes by their neighborhood.

For undocumented parents, there's no guarantee that you'll see your kids at the end of the day every day, when you say hello to your kids and drop them off at school and off to work.

Because an investigation at work or a chance encounter with the local police could change your life forever.

The second thing I've learned is that people like me who understand this fear, who have mastered the English language and worked their way through the American system, when they reach high positions, advocate for the needs of the immigrant community in a way that no one else can and no one does.

I knew what it felt like to be afraid

because my family has experienced

The young people I cared for in the past were harassed not only by their classmates, but also by their teachers.

My husband traveled a lot when we were dating, so he was wary of using backpacks and growing a beard.

What I learned in 2001 is that it's not just my vote that counts, but my voice and my strengths.

I believe that these three things -- immigrant vote, voice and strength -- will help create a strong democracy in America.

In fact, we immigrants have the power to change the outcome of elections, to raise new questions in policy debates, and to change the archaic white, male-dominated leadership landscape that still prevails in America.

Then what should we do

Let's start with voting

I wouldn't be surprised if the vast majority of people who vote in America are white.

But you'd be surprised to hear that one-third of those who can vote are black or Latino or Asian.

But it's not just about having the right to vote, it's about whether you vote.

In 2012, half of all eligible Americans, Latinos and Asians, did not vote.

This kind of voting behavior isn't just limited to presidential elections.

It also affects state and local elections.

In 2015, a man named Lan Deep, the eldest son of a political refugee from Vietnam, ran for San Jose City Council.

he lost by 13 votes

This year, Lang once again roused himself to run for city council, and this time he won by 12 votes.

Each vote counts

People like Lan can make a difference when they have a political voice.

I need a voice like this

One of the reasons for this is that America's leadership does not reflect the racial makeup of America.

There are over 500,000 local and state offices in America.

Less than two percent of these offices are headed by Asians or Latinos, the two largest groups of immigrants.

The city of Yakima, Washington, where 49 percent of the population is Latino, had no Latinos on the city council until this year.

In 2016, three Latinos were elected to the city council for the first time.

Carmen Mendes is one of them

Carmen is the first in her family to go to college.

I grew up in Colima, Mexico and Yakima, Washington.

I'm a single mother working to defend the rights of Latinos.

I represent the voice of Latino residents and all Yakima citizens on the Yakima City Council.

And she became a role model for her daughter and for Latinos.

The third is the most underutilized asset of American democracy, the strength of immigrants.

We immigrants fought to get here.

The purpose is economic and educational opportunities

political and religious freedom

Chasing a lover, etc.

It is with this single-mindedness, this seriousness about America, that we immigrants go into public service.

Athena Salman, for example, won the Arizona legislative primary last week.

Athina's father moved from the West Bank to Chicago and met Athina's mother.

A woman of Italian, Mexican and German descent.

They moved to Arizona and settled there.

When Athena becomes a state legislature, she plans to fight for education funds and more, so that families like Athina who receive assistance can have the financial security that everyone wants.

We must all work together to ensure that immigrant votes, voices and strengths are part of American democracy.

It's not just me, it's your responsibility

won't be easy to achieve

No one knows what will happen. It's like adding a new factor to an equation.

it feels a little scary

You're afraid I'll lose your job, and I'm afraid you'll never get that job.

And all of us are afraid of losing the country we know and love.

I'm afraid you'll take this country, and you're afraid I'll take over America.

This year's presidential election is a hotly contested one, and immigrants who have gone through experiences like mine are being taught that they could be eliminated at the whim of their leaders.

I fought for my place in this country, and I will continue to fight every day.

I never lose my optimism, because I know there are millions of immigrants like me before me, behind me, and all around me.

This is also a country of immigrants for us.

thank you

(applause)

It was April of last year

One night, some of us went out to celebrate a friend's birthday.

We hadn't seen each other in weeks, and it was the perfect night to reunite.

On my way home that night, I took the last Underground train back to the other side of London.

nothing happened on the way

Arriving at the nearest station, I started walking the 10 minute walk to my house.

I turned the corner into the street where my house was, and just as the house was in sight, I heard footsteps behind me.

Before I even had time to figure out what was going on, he put his hands over my mouth and I couldn't breathe. A young man behind me dragged me to the ground, smashed my head repeatedly against the pavement, and my face started to bleed.

Every time my head was slammed into the concrete, I still remember the thought that echoed in my mind: "Is this the end of my life?"

I didn't realize it at all, but I was being followed all the way out of the station.

A few hours later, I was shirtless and in nothing but my underwear, and I was taken before police to photograph the cuts and bruises I had on my body as evidence of my crime.

Words cannot describe the mixture of pain, shame, turmoil and resentment that has gripped and tormented me from this moment on for weeks.

But I wanted to organize all these feelings in a way that I could digest them bit by bit, so I decided to do what seemed the most natural: to write.

It started as an exercise in venting my feelings.

I wrote a letter to the assailant, addressed him as a person, "you," and spoke to him as a member of the community he had so violently violated that night.

Highlighting the various aftermath of his actions, he wrote, "Have you ever thought about the people around you?

I don't know what kind of people are involved in your life

i don't know anything about you

But I do know that I wasn't the only one you assaulted that night.

I am a daughter, a friend, a sister, a student, a cousin, a niece, a neighbor.

All the people I connect with in these relationships make up my community.

you assaulted them all

You've trampled on a truth I'll never give up The truth that everyone around me embodies--the truth that there are far more good men than bad men in the world."

But never let this one thing cause me to lose faith in my community and in the solidarity of humanity as a whole, and I'm reminded of the London bombings of July 2005, when the mayor of London and even my parents insisted that we should take the subway the next day, so that we wouldn't be defined and changed by the people who unsettled us.

So I said to the assailant, "What you did was the bombing, but I'm still going to take the subway.

People in my community don't worry about walking home at night.

We take the last train home, and we walk home alone, because we're not going to accept the idea that this is self-harming behavior, and we don't want society to take root in it.

If anyone in our community is in danger, we will continue to band together and fight like an army.

You have no chance of winning in this battle."

When I wrote this letter -- (Applause) Thank you.

(Applause) When I wrote this letter, I was in the middle of my exams at the University of Oxford, working for the university's student newspaper.

Fortunately, I had the support of family and friends, but it was also a lonely time.

I didn't know, or at least I didn't know, anyone else who had gone through something like this, even though I knew from the news and statistics how common sexual violence was.

I didn't really know a single person who shared these experiences publicly.

So, on a whim, I decided that by putting the letter in the student newspaper, I hoped it would reach someone who might be at Oxford with similar experiences and feelings.

At the end of the letter, I invited readers to submit their stories, using the hashtag #NotGuilty to emphasize that victims of sexual violence can speak up about what happened to them without feeling shame or guilt, and to show that we can all stand together against sexual violence.

Quite unexpectedly, in just one night, the letter went viral.

In no time at all, I received hundreds of testimonials from men and women around the world, and I decided to post them on my website.

Hashtags evolved into campaigns

An Australian woman in her 40s with children wrote that while she was out at night, a man followed her to the bathroom and repeatedly grabbed her by the crotch.

A man in the Netherlands was date-raped while visiting London, and when he complained about it, no one listened.

People from India and South America were texting me on Facebook, asking me how I could get the campaign out there.

One of the first stories I got was from a woman named Nicky, who said she had been sexually abused by her own father growing up.

And my friends told me, from what happened just last week to what happened years ago, it was just unimaginable.

Along with these messages came messages of hope, empowered by community voices standing up against sexual violence and victim blaming.

A woman named Olivia shared how she was assaulted by someone she'd trusted and cared about for a long time.

Many stories moved me and I want to be strong like them.

I'm sure you'll become it."

People all over the world started using this hashtag on Twitter, and my letter was picked up and reprinted in national newspapers, and translated into several languages ​​around the world.

By the way, one thing bothered me about the media attention to this letter.

If something makes the front page -- if it's called "news" -- it's treated as something new or surprising.

But sexual violence is nothing new.

Like other types of injustice, it's always been in the media.

But through the campaign, these injustices were not just news stories, but real-life experiences that impacted real people, where they banded together to create what they needed but didn't exist: a place to share their experiences, a reassurance that they weren't alone, and an open discussion that helped reduce the stigma this issue inflicted on victims.

What was at the forefront of the story was the voices of the actual victims, not the journalists and social media comments.

That's why this story was news

In today's internet world, where everyone is connected and social media is thriving, it's certainly a great tool for social change.

And that's why a culture of "reaction" is becoming more pervasive, from small complaints like "the train is running late" to serious atrocities like war, genocide and terrorist attacks.

As soon as they see an expression of dissatisfaction, they jump right in and "react" to tweets, Facebook posts, hashtags, etc. to show others that they've responded.

The problem with this collective reaction is that sometimes it's tantamount to not reacting at all, because after all, it's the same as not doing anything at all.

You may feel better, you may think you've contributed to shared grief or anger, but you're actually not making any difference.

And it even drowns out the voices of those who are actually affected by the evil that they are really trying to reach out to.

Equally worrisome is that some of the reactions to injustice tend to create more barriers, a rush to find culprits in the hope of finding simple solutions to complex problems.

One of the British tabloids published my letter with the headline, "Oxford student launches online campaign to humiliate assaulter."

But the purpose of the campaign is never to humiliate anyone.

It was about creating a space for people to speak up and be heard.

The provocative Twitter trolls soon did more harm, spelling out the race and class of the assailants to spread their own bigoted ideas.

Some people came to the conclusion that the whole thing was a hoax.

(laughs) It's funny, isn't it?

It's as if I'm saying, "Everyone! I'm sorry, but I can't meet you. I'm busy hating all men by the time I'm 30."

(Laughter) I'm pretty sure about this, but I don't think anyone would say that to their face.

But on social media, because we're on the other side of the screen and accessing it from home, it's almost as if we forget that what we're doing is a public act that can be read and impacted by others.

Going back to getting on the subway, another big concern is that the "noise" of online reactions to injustice that amplifies us all too easily portrays us as victims.

A few months before the campaign started, well, before it all happened, I went to TEDx in Oxford and listened to Zelda LaGrange, Nelson Mandela's former personal assistant.

One episode in the story was very memorable.

When Mandela was sued by the South African Rugby Union, he demanded an inquiry from the union over sports misconduct.

In court, Mandela is said to have walked up to the rugby union's lawyers, shook hands, and conversed with each person in the other's language.

Zelda protested, saying that given the injustices committed by the Association, he was not worthy of respect.

Mandela turned around and said, "Never let the enemy dictate the rules of warfare."

When I heard this phrase, I didn't know why it was so important, but it felt important, so I wrote it down in my notebook.

I've thought about that word many times since.

Taking revenge and showing hatred to those who have wronged us may seem like a human instinct in the face of injustice, but we need to break this vicious cycle if we are to transform the negative events of injustice into positive social change.

Otherwise, we'll continue to let the enemy dictate the rules of the battle, creating a dichotomy in which we, who have suffered injustice, become "victims" and are pitted against their "perpetrators."

Just as we continued to ride the subway after the terrorist attacks, it's important to make the platform that connects people and builds communities a place that never rests on its laurels.

I'm not saying don't react on social media, it's almost entirely thanks to social media that the #NotGuilty campaign has spread.

But I think you should think more carefully about how you react to injustice.

Let's start by asking ourselves two questions

The first is, "Why do you think this is unjust?"

In my case there are several reasons

Because someone hurt me or the people I love -- doing it under the premise that they didn't need to be held accountable or aware of the damage they did.

Not only that, but thousands of men and women suffer sexual violence every day and cry themselves to sleep, yet society doesn't spend the same amount of time reporting on it as it does on other issues.

and the victim is still to blame

The second thing we should ask ourselves is, "Given the reasons, how can we change this?"

For us, the answer was to hold the perpetrators and others to account.

It was to point out the consequences they caused.

And to give the issue of sexual violence more time in the press, to reinstate discussions that have been shunned for too long in the media among friends and family, and to stress victims not to blame themselves.

It may take a long time to eradicate the problem

In this way, we can use social media as a useful tool for social justice, as an educational tool, as a tool for creating dialogue, as a tool to bring issues to the attention of those in power, and to make the voices of those affected really heard.

Answers to these questions may not be easy to find

I can't actually find it

But that doesn't mean you can't have a thoughtful reaction.

How can we turn our resentment of injustice? Even in the most inconceivable cases, we can think of not what we can do, but what we can choose not to do.

You can choose not to increase the wall by hitting injustice with more prejudice and hatred.

We can avoid drowning out the voices of those who are actually affected.

It's okay to react to injustice, but you can be careful not to forget about it the next day because the subject has changed.

Sometimes it's ironic not to react right away, but sometimes it's the best thing to do right now.

Injustice may make you angry, upset, and bleeding, but dare to think about how you might react.

Let's not fall into a society where we take responsibility for what we're supposed to do, but we're happy to pounce on injustice and humiliate others.

Let's not forget the distinction between "criticism" and "abuse" that Internet users all too often forget.

Just because you're in front of a screen, don't forget to think before you speak.

When you make noise on social media, don't drown out victims' complaints, but amplify their voices. Let's make the Internet a place where people feel they're never alone when they share their experiences.

This stance on injustice is reminiscent of the fundamentals of the Internet: "wiring," "signaling," "connecting" -- all these words mean "connecting," not "dividing," people.

Look up the word "justice" in the dictionary. Before the definition of "punishment," before "law enforcement" and "jurisdiction," it says "persistence of what is right."

I think there are few things more "right" in this world than for people to connect and unite.

If we can do that with social media, we can bring about some really powerful justice.

thank you very much

(applause)

One hot October morning, I stepped off the night train and found myself in Mandalay, the ancient capital of the Burmese Dynasty, which is now Myanmar.

I went out into the street and saw a bunch of rough looking guys hanging out, all standing by their bike taxis.

One of them approached me and offered me a tour guide.

I was stunned by the price he offered

It was cheaper than the one chocolate bar I always buy.

So he gets into a bike taxi and he starts pedaling slowly between palaces and pagodas.

And he told me how he came to the city from his small village.

got a degree in mathematics

I dreamed of becoming a teacher

Life was tough under the dictatorship, and for the time being, this was the only way to make a living.

It is said that he often spends the night in a bicycle taxi to catch passengers on the night train that arrive early in the morning.

As soon as we were talking, I realized that we had a lot in common. We were both in our twenties and fascinated by different cultures.

Leaving the busy boulevard, I began to make my way through the rough alleys, rattling around.

All around were old shacks that were in disrepair.

I was completely disoriented and realized that anything could happen at any moment.

Even if I'm attacked, even if I'm drugged, no matter what happens

no one will notice

At last we stopped at our destination and were ushered into a hovel, a small one-room dwelling.

So he bent down and reached under the bed

i was frozen

I waited with bated breath wondering what to take out.

I took out the box

Tucked away in a box were the letters he had received from foreign visitors, some of which had small, tattered black-and-white photographs of his new foreign friends.

As we parted ways that night, I realized that this experience had also shown me the hidden meaning of travel: to take the plunge, to go where you wouldn't normally go, outwardly and inwardly, to venture into the unknown, to experience the uncertainties, even the fears.

In our daily lives, we tend to take everything for granted and take it for granted.

But when you go out there, you're always reminded that that's not the case, that it's impossible to fully understand everything.

Everywhere, "People seek rest," Ralph Waldo Emerson reminds us, "But restlessness is what gives us hope."

I've had the pleasure of sharing a lot of inspiring ideas and discoveries at this conference, and in just about every way it's been an exciting push to expand our knowledge.

But at some point, we also experience things that knowledge can't solve.

That's the point in life that's the big starting point, the point where you fall in love, or you lose a friend, or the light goes out.

When you lose your sense of direction, when you lose yourself in fear, you can find your true self.

I don't think ignorance is bliss

Scientific progress is undeniably giving us a brighter, longer and healthier life.

I can't thank the teacher who taught me the laws of physics, or the teacher who taught me that 3x3 is 9.

It can be counted on your finger day or night if you want.

But if a mathematician tells you that -3x-3 is also 9, then you can almost agree with the logic.

In other words, the opposite of knowledge is not necessarily ignorance.

Is it marvel

or wonder

can be a possibility

What I've learned from my own experience is that what I don't know is definitely more motivating than what I know, and it has become the driving force for me to move forward.

In addition, there were many times when I felt a sense of solidarity with people around me because of things I didn't know.

I traveled to Japan with His Holiness the Dalai Lama every November for the past eight years.

"Even I don't know," was the phrase he uttered every day that gave people comfort and confidence.

“What are the future prospects of Tibet?”

"When will world peace come?"

“What is the best way to raise a child?”

And this wise man says, "Honestly, I don't know either."

Nobel Prize-winning economist Daniel Kahneman has been studying human behavior for more than 60 years, and his research shows that people are more confident than they should be about what they think they know.

To quote his striking words, we have an "infinite capacity to defy ignorance."

We kind of predict that our team will win the championship this weekend, and we only remember that fact when it happens.

Groping in the dark most of the time

That's where true intimacy is hidden.

Do you know what your lover will do tomorrow?

would you like to know?

Adam and Eve, who some call the progenitors of all mankind, were immortal as long as they ate from the tree of life.

But the moment I began to eat from the tree of the knowledge of good and evil, it ceased to be pure white.

Their self-consciousness made them embarrassed and restless.

By the time it was too late, they realized that there were things they should know, but there were also many things that they shouldn't have pursued.

When I was a kid, of course, as a kid, I thought I knew everything.

After 20 years of immersed education and knowledge, I worked in the information industry, contributing to the information magazine Time.

And when I first set out on my first trip to Japan, I spent two and a half weeks and brought home a 40-page essay that I had written from scratch, detailing Japanese temples, fashion, baseball, and the heart of Japan.

However, in the midst of all this, I was moved by the fact that there were facts that I still didn't fully understand, and I made up my mind to settle down in Japan.

Twenty-eight years later, I still can't say enough about this adopted home.

And that's the beauty of it, because every day I can make new discoveries, and in the process, looking around the corner, there are hundreds of thousands of things that I would never know.

Knowledge is a priceless gift

But the illusion of knowledge is more dangerous than ignorance.

Thinking you understand your lover, thinking you know your enemy, is more dangerous than admitting you can't know someone.

Every morning in my little home in Japan, in the sunshine, I dare not look at the weather forecast because it clouds my mind and distracts me, even if the sun is out.

It's been 34 years since I started working as a writer.

One thing I've learned is that when you don't control your own path, when you don't know what's going to happen next, when you're not arrogant that you're better than those around you, change comes.

It's the same with love, and it's the same in times of crisis.

All of a sudden, we're called back to that bike-taxi, and as we tumble off the wide, light-lit road and tumble down the road, we're reminded of the first cardinal rule of travel, which is also the cardinal rule of life: how much you give yourself up determines how strong you are.

At the end of the day, isn't being human a lot more meaningful than being all-knowing?

thank you

(applause)

“We will declare war on cancer and win by 2015.”

This is the message that the US Congress and the National Cancer Institute proclaimed just a short time ago, in 2003.

I don't know what you think, but I'm skeptical of this.

We're still far from winning, and I'm sure you think so too.

I believe that the reason our battle against cancer will never be won is because we are fighting it without "seeing" it.

I'll start by telling you about my friend.

His name is Ehud, and a few years ago he was diagnosed with a brain tumor.

It wasn't just the common type of brain tumor, it was diagnosed as the most terrifying type of brain tumor.

In fact, it was so malignant that doctors told him he only had 12 months to live, and he had to find a cure in those 12 months.

If no cure is found, he will die.

But the good news is that there are many options for treatment, but the bad news is that it's not clear if any of these treatments work, and you'll have to try them for three months to find out.

So I can't try that many treatments.

Ehud started his first treatment, and when I met him a few days after starting it, he said, "Adam, it seems to be working.

I'm really lucky, something is changing."

I asked, "Really? Why do you think so?"

His reply was, "I feel so sick in my head

because something is happening

It must work."

Unfortunately, after three months, I was informed that it was not working.

Ehud decided to try a second treatment.

same thing repeated

"I feel terribly sick. Something must be working."

Three months later, I got another bad report.

Try a third or fourth treatment

As predicted, Ehud has passed away.

We get very emotional when someone close to us is battling this tremendous amount of suffering.

many things cross my mind

I felt resentment

I was indignant that this was the only treatment I could do.

Upon closer inspection, I found that

Not only was this the best treatment a doctor could give Ehud, it was also-

A leading doctor was the best possible treatment for brain tumors in general.

As a matter of fact, for cancer in general, we're pretty clueless.

I looked at one of the statistics, and I'm sure some of you have seen it too.

What I'm showing you here is the actual number of cancer deaths among women living in the United States since the 1930s.

No noticeable improvement, still a big problem

you will understand

But things are changing

For example, lung cancer is on the rise.

Tobacco is the cause

And for example, stomach cancer, which was once the deadliest form of cancer, has almost disappeared.

I wonder why? Do you know everyone?

Why were humans able to overcome stomach cancer?

What medical breakthrough came to the world that saved mankind from stomach cancer?

Was it due to the discovery of new drugs and diagnostic methods?

you all understand

It's the invention of the refrigerator that stopped us from eating rotten meat.

In the medical field, the most useful event for cancer research was the invention of the refrigerator.

(Laughter) That's what it is.

not doing great

It's not my intention to underestimate progress in cancer research or anything like that.

As you can see, over the past 50 years or so, there's been an amazing amount of cancer research and some really important discoveries about what cancer is.

But in spite of that, the walls that stand in our way are thick.

I think the main reason why we're not seeing significant results is because we're fighting cancer without "seeing it."

This is where medical imaging technology can help.

It's time for my research field

I'm going to show you what the latest technology looks like in diagnosing brain tumor patients. In fact, it's applicable to almost all cancers.

yes this way

This is a PET/CT scan, and what you see in this is that CT scans can visualize bones, and PET scans can show where tumors are.

What you see here is a molecule of sugar with a small tag attached to it, sending out a signal out of the body, "I'm here."

Billions of sugar molecules are injected into the patient and move around the body, seeking out cells that need sugar.

For example, the heart is shining

That's because your heart needs a lot of sugar.

Bladder is also glowing

In this case, the bladder is responsible for expelling sugar from the body.

There are signals coming from other places, but these are actually tumors.

this is really great technology

For the first time, when we examine the inside of people's bodies, we can do it non-invasively, without removing the cells to look under the microscope, without removing the cells to look under the microscope.

"Where's the cancer?"

As you can see, a PET scan can clearly show where the tumor is located as a hotspot.

It seems like a very miraculous thing, but unfortunately I can't say for sure.

I see little hotspots

How many cancer cells do you think are in these tumors?

It contains about 100 million cancer cells, but it's only when they gather together that we can see them.

In order for each of these tiny dots visible in this image to be detectable, there must be at least 100 million cancer cells clustered together.

That might seem like a huge number, but it's actually true.

This is in fact a disturbingly large number. To be truly effective in treating cancer, we need to catch it early enough that we need to be able to detect tumors that consist of a thousand cells, and ideally - even just a few.

So it's clear that we're far from a solution.

Now let's do a little experiment

Imagine that you became a brain surgeon.

You're in the operating room right now, with the patient in front of you, and your job is to make sure the tumor is removed.

When you look at the patient, the scalp and skull have already been removed, and you're looking at the brain.

What we do know about this patient is that he has a tumor the size of a golf ball in the right frontal lobe of his brain.

This is what a visible tumor looks like

Unfortunately, even if you look closely, you can't tell cancer tissue from healthy tissue because they look the same.

So if you put your thumb inside and lightly touch the brain, the tumor tissue is a little firmer and tauter, so if you touch it like this, you can say, "I think the tumor is there."

So I take out my scalpel and carefully remove the tumor bit by bit.

As you remove more and more of the tumor, you reach a stage where you can say, "Okay, I'm done. I've removed everything."

At this stage -- you might have thought this was really barbaric -- but now you're faced with one of the most difficult decisions of your life.

Because the decision is, are we going to finish the operation now and send the patient home, or should we take the risk that there might be some invisible tumor cells left behind, or should we add some margin of safety, usually a couple of centimeters extra around the tumor, to make sure we're removing all the tumor?

It's a tough decision, but unfortunately one that surgeons who operate on brain tumors cannot avoid every day in the face of their patients.

One day, I had a conversation with a colleague in the lab that said, "There has to be a better way."

It means more than just saying to a friend, "There must be a better way."

there just has to be a better way

It's too bad that there is no better way

I looked back

Remember all the PET scans and sugars I talked about earlier.

So we thought, "Instead of sugar molecules, let's use tiny particles of gold to give us interesting chemical properties.

Let's give it properties that cancer cells can find."

It injected billions of gold particles into patients and allowed them to circulate throughout the body. It could be called a spy.

If the cell is normal, proceed to the next step.

If it's a cancer cell, it sticks to it, shines, and says, "I'm here, look at me."

Then a special camera developed in our lab captures them.

Once found, brain tumor surgeons would be able to remove just the tumor, leaving the healthy cells untouched.

I tried it and it worked

Let me show you an example.

What you see here is an image of the brain of a mouse, which had previously been implanted with a small tumor.

The tumor grows in the brain of the mouse, so he calls the doctor and asks him to treat this mouse as a patient, and operate on it.

While he's operating, we keep taking images that show where the gold particles are.

First, we'll inject gold particles into the body of the mouse. Look at the left corner of the screen. The bottom image shows where the gold particles are.

And what's amazing is that these gold particles reach the tumor, where they glow and say, "Here it is, there's a tumor here."

We can see a tumor, but we haven't shown this to the doctor yet.

I'm going to ask the doctor, "Start removing the tumor," and you can see that the doctor removed a quarter of the tumor first, and this part is gone.

Next, and then, and then, and then, one quarter at a time, it seems that everything is finally finished.

At this stage, the doctor comes to us and says, "Okay, I'm done. What do you want me to do next?

Are you going to finish with this, do you want me to cut a little extra around it? ”

We reply "Wait a minute"

And I tell them, "There are two tumors left, so please don't cut the whole thing out, just cut this little part out.

Let's take a look at it again once we've cut these out."

When the doctor finished the excision, amazingly, all the tumor cells were gone.

Now, what's important here is not just that the tumor cells have been completely cleared from the patient's brain or the mouse brain.

Most importantly, you don't have to remove the entire normal brain in the process of this surgery.

We can now imagine a world where doctors, surgeons, when they remove a tumor, know where to cut it.

There's a reason you shouldn't leave any tumor behind.

Anything left behind, even if it's just a few cells, will grow and the tumor will regenerate, and the tumor will come back.

In fact, the ultimate cause of unsuccessful malignant brain tumor resections, 80 to 90 percent, is the presence of tiny, unresectable tumors just outside the excision.

That's why this testing method is so effective.

In my lab at Stanford, my students and I are thinking about what to do next.

The goal of medical imaging is to look inside the human body and see individual cells.

This would allow us to detect tumors much earlier than they could have grown to 100 million cancer cells, so we could do something about it.

If we can distinguish between individual cells, we can ask insightful questions.

In the lab, this led us to ask questions about cancer cells, such as: Will the treatments we give affect cancer cells?

If you find that it doesn't work, you can immediately stop the treatment in a matter of days instead of waiting three months.

That's why patients like Ehud don't suffer the terrible side effects of continuing to take very nasty chemotherapy drugs that don't work.

The reality is, let's be honest, we're a long way from winning the battle against cancer.

But I hope that at least we can fight cancer by "seeing" it with better medical imaging technology.

thank you

(applause)

I wrote this poem because I heard an actress you know tell a famous interviewer on TV, "I'm really into the internet these days."

"I wish it was a little more organized."

Therefore

(Laughter) If I could control the internet, I'd sell my broken heart on an eBay auction.

With that money, you can go to amazon, buy a phone book from a foreign country, and make calls until you find someone who knows how to do it.

(Laughter) If I were an Internet curator, I'd use Mapquest to track my lover's emotional ups and downs.

Turn left in a bad mood If you're in the sky, turn right

The crossroads of emotions as you wish

Someday I'll be as thin as a baking pan, but I'll grow long and wide in every direction

If the internet was mine, Napster Monster Friendster.com would be one giant website.

So you can pretend you're looking for a job, but you can listen to cool music while you're chatting with your friends.

(Laughter) If I were the owner of the Internet, I could email dead people.

(Laughter) They're not going to reply.

(Laughter) As long as you have their name in your inbox (Laughter) you'll be fine.

The text says, "Hey, it's me. I'm lonely."

(laughs) "Listen, it's not bad to die."

"If you're alive, you'll want to raise children, have world peace, and eat snacks."

If I designed the Internet, a boy with skis as swords and garbage can lids as shields would shout repeatedly in the orchard, "I am the king of oranges."

"I am the king of oranges I am the king of oranges"

please follow me

(Laughs) Grandma.com teaches biscuit recipes and brim polishing

１ ２ ３

There is a link to a dog-filled goods site

this is my grandfather

It will be skipped to 'Frustrated Batsu 3 former police officer and father'

He's interested in sites like "My mum is kind of dumb, but still gives ginger cookies for Christmas."

Now, if I'm king of the internet, I'm not immortal, right?

But by this point, you'll already have the lowest-rate mortgage and the world's largest penis. (Laughter) Spam will be outlawed on Coronation Day.

I don't need this

Become like an internet genius Raise yourself to a god Before long, like this Bang! it's wireless

(laughs) Right? Maybe Google will adopt

It can infiltrate servers and firewalls like a virus The world wide web is smart, bold and well-organized Even if it's a modern miracle, I'll do it until Oracle is like that But if such a big change happens, you'll think Macs and PCs will be weird God's attempt.net?

It's like life

It's not a question of whether you can or not, right?

The interface is messed up.

Every time you're lucky enough to log on, "Hallelujah" could be your cyberspace theme song.

do not offer prayers

I don't write hymns

do not recite the nembutsu

Just send a blessed email to someone who thinks it's addressed to @la-la-la-.com

Thank you TED

(applause)

i am a painter

I paint large-scale figurative paintings, so when I paint people, they look like this.

But tonight, I'm here to tell you something personal, an event that changed my work and my perspective.

It's a path we all take, and I hope my experience can help someone else.

Let me introduce myself, I was the youngest of eight children.

Yes, there are eight children in the family.

I had six brothers and one sister

What it's like, when my family went on vacation, we took the bus.

(Laughter) My super mom drove all over town and took all the kids to different after-school activities, not on the bus.

There was also a regular car.

My mother took me to art class, not one or two.

My mother took me to every art class from the ages of 8 to 16, because that was all I wanted to do.

In New York, my mother even took classes with me.

Now, as the youngest of eight, I've learned a few survival tricks.

Rule #1: Don't let your brother see you goofy

So I learned to be quiet, tidy, and carefully follow the rules and fit in.

But when I was painting, I was making the rules.

it was my world

By the time I was 14, I really wanted to be an artist.

I made plans to become a waitress to help me paint.

That's how I continued to hone my skills

I went to graduate school, got my MFA, and had my first solo exhibition, and my brother asked, "What are those red dots next to the painting?"

I was the one who was most surprised

The red dot means that the painting has been sold, which means that I can pay the rent with this money.

My apartment had four outlets, so I couldn't use the microwave and the toaster at the same time, but I was still able to pay the rent.

i was so happy

This is the picture I drew at that time

I had to draw as realistically as possible.

It had to be detailed and authentic.

It was a place where I could be alone and control everything.

I've been painting underwater people ever since.

Bathtubs and showers are completely enclosed environments.

It's a private, private space.

I've done about 200 paintings like this, some of them are around 2 meters long.

In this painting, I mixed flour in a bathtub to make it cloudy, and then I put cooking oil on the surface, and I had the little girl come inside, and when I lit it up, it was so beautiful, I couldn't wait to paint it.

Driven by this compulsive curiosity, I was always on the lookout for new additions: vinyl, steam, glass.

One time, I applied petroleum jelly to my hair to see how it looked.

don't do it

(Laughter) So things are going well.

I was on my way to find my way

I was surrounded by artists full of passion and motivation, going to new exhibitions and events.

With some success and acceptance, I moved into an apartment with more than four outlets.

My mother and I spent late nights telling each other what we were thinking and inspiring each other.

my mother used to make beautiful pottery

A friend of mine named Bo drew this picture of his wife and I dancing on the beach, and he called it "The Light Years."

When I asked him what he meant, he said, "You're adults, you're not children anymore, but you don't have the responsibility of your life yet."

Yes, those were easy years

October 8, 2011 The years of lightness came to an end

my mother was diagnosed with lung cancer

The cancer had spread to his bones and had affected his brain.

When my mother told me so, I fell to my knees.

I'm totally lost

When I picked myself up and looked at my mother, I realized it wasn't about me.

The important thing is to find a way to help my mother.

My father was a doctor, so I had the great advantage of having him take care of me, and he treated my mother beautifully.

I wanted to do whatever I could, so I tried everything.

everyone felt the same

I looked into alternative medicine, juicing in my diet, acupuncture.

And then I asked my mother, "What do you want me to do?"

Mother replied "No"

"Take it easy now, I'll do it later," he says.

She knew what was going on. She knew what doctors and experts on the Internet didn't know: how she wanted to get over it.

I should have asked him

If I try to force something, I won't be able to notice my mother's feelings

I decided to just spend time with my mother, and whatever that meant, and whatever the circumstances, I just listened to her.

If I was resisting before, now I've surrendered, stopped controlling the uncontrollable, and just spent the process with my mother.

Time slowed down and dates no longer mattered.

we have a daily routine

Early every morning, I crawl into my mother's bed and sleep with her.

My brother comes over for breakfast, and it makes me so happy when I hear his car on the road.

I help my mother get up, I take her hands and I help her walk to the kitchen.

My mother had this big mug that she made herself, and she loved drinking coffee from it, and she loved her Irish soda bread for breakfast.

After that it's a shower my mom loved this

My mom likes warm water, so I tried to be as gentle as possible, like a spa.

My sister sometimes came to help

We had warm towels and slippers ready to go, so she didn't get cold for a second.

I dried my mother's hair

In the evening, my brother brought the kids in, and this was the highlight of my mother's day.

As time went on, we started using wheelchairs, and my mom didn't have much of an appetite, so she used the smallest teacup she could get her coffee for.

I couldn't care for my mother anymore, so I hired someone to help me in the shower.

These simple routines became our sacred rituals, and we repeated them day after day, while the cancer was growing.

It was painful in the face of human powerlessness, but it was also exactly what I wanted to do.

We called this time "beautiful cruelty."

Mother passed away on October 26, 2012

1 year and 3 weeks after diagnosis

mother passed away

My brothers and sisters, my father, and I all supported each other and cared for each other, united.

It was as if all the dynamics and pre-existing roles of our whole family had disappeared, and we were just sitting together in this unknown, feeling the same, caring about each other.

thanks to my family

I work alone in a studio most of the time, so I had no idea that this kind of connection was important and healing.

this was the most important

was what I was missing all along

After the funeral, I had to go back to the studio.

I packed my car and headed back to Brooklyn.

This is a picture of that time

It was as if everything that was unraveling inside me was released there.

It's a safe, very, very carefully crafted safe space that I've created in my paintings all my life, but it's been a myth.

it didn't help

I was frightened because I didn't want to paint anymore.

i went into the woods

I thought I'd go outside

I took my paints with me. I don't paint landscapes, but I wasn't any kind of painter.

One of the paintings I did at that time was still wet and I had left it outside all night next to the light I had in the woods.

In the morning the painting was covered with insects

It doesn't matter.

I took all these paintings back to the studio, and I scraped them, carved them, poured paint over them, added more paint, added lines.

I was just waiting to see what would happen without any plans.

This is what put those insects in

I wasn't trying to represent real space.

It was the chaos and the imperfection that fascinated me, and something began to happen.

I regained my curiosity

This is another picture I brought back from the forest.

But please note that

I couldn't draw as well as I used to

Pictures can only suggest and suggest, and cannot explain or describe.

And it's this imperfect, chaotic, turbulent surface that tells the story.

I became just as curious as when I was a student.

The next thing I wanted to do was put people in these paintings. I loved this new environment, so I wanted to include both the people and the atmosphere.

When I came up with this idea, I felt nauseous and dizzy, and it must have been the adrenaline, but for me, it was a really good sign.

I'd like to show you the work I've been working on.

This is something I haven't published yet, and this is probably a preview of the next exhibition, and this is who I am at the moment.

It's an expansive space, an alternative to isolated bathtubs.

go outside instead of inside

Let go of control and experience imperfection. Yes, imperfection is allowed.

And it is in this imperfection that subtlety is found.

I could hear a voice deep inside me. What is most important to me? It's human connection. Human connection happens where there's no resistance or control.

i want to paint that

this is what i learned

We all experience great losses in our lives, whether it's jobs, careers, relationships, love, or youth.

we lose our health we lose our loved ones

These losses are out of control

We have no choice but to surrender

let it go

Get on your knees and be humble

Without trying to change, without even wishing to change

just leave it as it is

And that's where you create the space where you can feel the subtleties of yourself, and that's the most important thing, your inner voice.

And with curiosity, let's connect with things and people that really exist here. Awaken and live.

this is what everyone wants

Take the opportunity to find beauty in the unknown, in the unpredictable, and even in the harshest of experiences.

thank you

(applause)

Have you noticed anything? When I ask people to talk about what they have changed to improve their private life, many people are very enthusiastic about it.

Whether it's training for a marathon, picking up an old hobby, or learning a new skill, for many people, the process of self-transformation is a powerful stimulus of positive emotions.

Self-transformation is a source of confidence, motivation and even exhilaration.

If you look at the titles of self-development books, you'll understand "Wake up the giant within" (Japanese title "How to make your dreams come true in an instant") "How to use the power of the present" ("Enlightenment makes life simple and easy") The ultimate answer is this. (“You can live more “for yourself”!”)

(Laughter) When it comes to self-transformation, we can't help but get excited.

But some of the transformations provoke an entirely different feeling.

organizational change

If you were an ordinary person, and you were told, "From now on, our company will carry out organizational reforms," ​​you would probably think, "This is terrible..."

(laughs)

Your face will turn pale and overheated to the point that you will have to turn your head to try and hide.

In fact, it may be possible to escape, but it's impossible to stay hidden.

Because most of us spend most of our waking hours inside organizations.

Globalization, technological change, and other factors are forcing our organizations to constantly adapt.

This is what I call the era of constant change.

When I mentioned this to my wife, Nicola, she said, "Continuous change?

You look very tired."

Don't you think so right now too? it may be true

Especially if we continue to approach organizational change the way we've always done it.

But you can't hide, so you have to sort out two things.

The first is why change is exhausting.

And the second is how to solve it.

But before that, let's first recognize that change is difficult.

It's natural for people to dislike change, especially if it's forced.

But it's also true that the way an organization works can make change unacceptable and exhausting than it needs to be.

For example, the delay in timing the top to take action

As a result, when you're in an emergency, you start right up.

It is natural to be exhausted

Or, due to urgency, only short-term results are emphasized, and the future is not visible.

Sometimes we try to let the current crisis pass by, taking some superficial makeshift measures and hoping we can get back to normal.

In some ways, this approach is similar to how some students study for national tests.

In order to raise the score, the teacher will give a class for exam preparation.

It is said that it is effective, but in fact, the score often goes up.

But it doesn't really fit the purpose of education, which is to equip students for long-term success.

Now, given these challenges, how can we change the way we transform organizations so that they create confidence and motivation instead of exhaustion?

There are five strategic imperatives to focus on here, all of which have one thing in common: a people-first attitude.

The first imperative to put this person first is to share purpose and inspire.

Most transformations have financial and operational goals.

They're important, and if you're a leader, they're likely to motivate you, but they won't do much to motivate those subordinate to your organization.

To motivate broadly, change must be tied to a stronger sense of purpose.

Take Lego as an example

The Lego Group is now one of the world's largest companies.

In fact, it's been through many transformations under some very effective leadership.

Each transformation had a specific goal, but like the North Star, it was all connected and guided by the big mission of the Lego company here: "Inspire and inspire the builders of tomorrow."

What was your motivation for going global?

It wasn't about increasing sales, it was about getting millions of kids who didn't know Lego to experience playing with blocks.

What motivates you to invest and innovate?

It's not about developing new products, it's about getting more children to experience the joy of learning through play.

Not surprisingly, this strong sense of purpose motivates the people at Lego.

The second imperative of People First is to be fully committed.

Too many transformations end in simple layoffs -- restructuring in the name of transformation.

We're in constant competition, and we might make some tough choices and downsize, just like sometimes you need to lose weight to run a marathon.

But weight loss alone won't get you to the finish line first.

To win, you have to go all out.

across the board

So it's not just about cutting costs, it's about strategies that will win in the medium term, strategies that drive growth, actions that fundamentally change the way companies operate, and, most importantly, investments in leadership and talent.

The third imperative of People First is to give employees what they need to thrive during and after the transformation.

Over the last few years, I've competed in several triathlon competitions.

To be honest, I'm not very strong, but I do have one special talent: I can find my bike in seconds.

(Laughter) After all, by the time I'm done swimming, there's almost no bike left.

(Laughter) Real triathletes know that swimming, biking, and long-distance running require different abilities, different tools, different skills and techniques.

Similarly, in organizational change, we must not forget to provide employees with the skills and tools they need in each process.

A global software company called Khronos realized that it needed to move away from software development as a product and toward software development as a service.

So to help our employees stay on top of that transformation, we first invested in and implemented new tools that would allow employees to track their usage of each feature in the new service, and their customer satisfaction.

We also invested in skills development so that our employees could solve customer service problems on the spot.

And most importantly, we've strengthened our internal collaboration so that we can deliver a consistently smooth customer experience in the future.

Thanks to investments like these, Khronos employees felt motivated and confident in their new roles rather than being overwhelmed by the transformation.

The era of constant change is a constant succession of changes.

So the fourth imperative is to instill a culture of continuous learning.

Satya Nadella, who became CEO of Microsoft in February 2014, embarked on an ambitious transformational journey to gain the strength to compete in a mobile, cloud-first world.

We've changed our strategy, our organization, and very importantly, our culture.

At the time, we had a culture where departments worked independently and competed with each other, which was not a good environment for learning.

Nadella stood up to this

With a vision of building a vibrant culture of learning, he took the lead and forced people to move away from the prevailing mindset of being the best person in the room and into a learning attitude: listen, learn, and bring out the best in their peers.

And it didn't take long for Microsoft employees to realize that the company culture had changed, and it was clear evidence that Microsoft had put people first.

The fifth and final imperative is for leaders.

In transformation, leaders need a clear roadmap with vision and milestones, and they need to hold people accountable for results.

In other words, along with pointing

You have to get everyone involved to win the hearts and minds of your employees.

Involvement-type leadership is essential to put people first

I live on the coast of San Francisco

Our basketball team is currently the best in the league.

He won the championship in 2015 and is expected to win again this year.

There are many reasons for strength.

Part of that is having good players, but a crucial reason is that our head coach, Steve Kerr, is an involvement leader.

When he came to the Warriors in 2014, the team wanted big changes.

He hadn't won an NBA Finals since 1975.

Kerr came in with a clear vision and immediately set out to transform.

First of all, I reached out to the players and the staff and pulled them in.

We created an environment for free discussion and solicited suggestions.

During the season he would often ask, "Tell me what I'm missing."

In the 4th round of the 2015 finals, there was an event that clearly showed his attitude.

With a record of 1-2, Kerr made the decision to change the starting order -- a bold move.

As a result, the Warriors won and then went on to become champions.

Kerr's decision is widely credited with being the key to this victory.

What's interesting is that the inventor wasn't actually Carr.

It was Kerr's 28-year-old assistant, Nick Ulen, who had the idea.

Because of Kerr's leadership style, Yulen wasn't afraid to make suggestions.

And Kerr not only listened, he adopted it, and after winning, he handed all the credit to Ulen, and everything he did was due to Kerr's all-encompassing leadership.

In an era of constant change, organizations are constantly changing.

But it doesn't have to be exhausting

We must boldly change the way we approach change for ourselves, for our organization, and for society.

So let's start by putting people first.

thank you

(applause)

(Music) (Applause) (Trevor Kopp) Dancing with celebrities.

(Laughter) At the time of the show's massive revival in ballroom dancing, me and Jeff were both full-time ballroom dance instructors, and it was an incredible response.

People who used to say "Foxtrot (a kind of ballroom dance)" would react like "A fox runs (trot)???"

(Laughter) Instead, I started doing feather step tricks and more fine poop.

You were stunned

The core stories about ballroom dancing that we've always been so passionate about -- like why salsa dances differently than the competitive rumba, or why the tango moves differently than the waltz -- all of that burst into the public consciousness and changed everything.

But while it was exciting -- because suddenly, for some reason, we were the cool guys -- (Laughter), it was also confusing.

Why ballroom dancing now? and

(Jeff Fox) Trevor and I used to twirl around each other, mix roles, and take a break from the lead role that we always had to do, until we got together for classes and jokes.

We've even devised a mechanism that alternates lead and follower roles as they dance, so that they take turns in an equitable manner.

And then, when we put this system into a show at a small festival, a big opportunity presented itself.

After a show, a playwright named Lisa O'Connell, who is the artistic director of a writing firm, stopped me and said, "Do you understand the ideological strength of the show right now?"

(Laughter) And that was the beginning of an eight-year collaboration that not only took us a step further in how we thought about role-swapping, but also explored how people become trapped in a single role and, more importantly, the fear of being defined by that role.

(Trevor) Because, of course, traditional Latin dance and ballroom dancing are not only dance systems, but they also reflect the social ideas of the time, such as how people think, how they are, and how they interact with others.

But one thing that's always been consistent throughout the ages is the notion that men lead and women follow.

Whether it's street salsa or competitive tango, the man leads and the woman follows.

So this is gender education.

It wasn't just about learning how to dance, men learned how to behave as men, and women learned how to behave like women.

is no longer a relic of the past

We don't just throw relics away, but we need to recognize that they belong to the past.

not currently applicable

It's like Shakespeare, and it's good to pay tribute to it and reprint it.

but it's a thing of the past

not representative of modern thinking

So we thought, "If you stripped it all down, what's the core of ballroom dancing?"

CA: The core principle of ballroom dancing is that one person leads and the other follows.

No matter who dances which role, the body movements are the same.

Gender is totally irrelevant in terms of the motion of objects.

(Laughter) But if we're going to reinvent the mold, we have to make it better representative of how people interact in the here and now of 2015.

When you watch ballroom dancing, it's not just what you see

Be aware of things that do not appear

Pairs are always one man and one woman

man and woman pair

that's all

it's always been that way

There are absolutely no same-sex couples or masculine woman/feminine man pairs.

In most major international dance competitions, same-sex pairs are simply not allowed to compete, and in many cases, the regulations prohibit them entirely.

(Trevor) Try doing a Google image search for 'Latin dance pros' to find real Latinos.

(Laughter) I guarantee it will take days.

No matter how you look at it, the only thing that actually comes out over many pages is a pair of a white man and a woman, with a lot of tanning spray and cancerous black skin.

(Laughter) There are no black or Asian or mixed race pairs, basically no non-white people.

Furthermore, even with only white male-female pairs, no female is taller and no male is shorter.

There's no need for women to be braver, and there's no need for men to be softer

Outside of the world of ballroom dancing, if you were to put this rule into conversation and put it in a movie, the public would never take it.

"Men give orders, women respond"

This kind of relationship, gay or straight, in any couple, in a healthy or healthy relationship, is completely unthinkable, isn't it?

We are applauding something that is far from reality.

Too many people are absent from the world of ballroom dancing.

(Music) (Applause) (Jeff) You just saw two guys dancing.

(Laughter) Look at that, a little bit.

it must have felt weird

It's funny, you could even say it's eye-catching, but it's kind of bizarre, isn't it?

Even people who are passionate about chasing same-sex ballroom competitions say that while same-sex pair dance is dynamic, powerful and exciting, it feels somehow different.

Speaking of looks, Alida and I do a typical close hold.

It's considered beautiful...

(Laughter) Why is this bad?

(Laughter) The conventional wisdom that the lead should be bigger and more masculine and the follower should be smaller and more feminine is a barrier.

CA: We thought about this from a completely different angle.

What if we could keep the notion of lead and follow, and leave out the part that ties it to gender?

What if we could take turns after leading and following each other?

And if you put it back?

What if we could do this in a conversational way? Like everyone does every day, take turns speaking and listening.

What if you could dance like that?

We called this dance technique "fluid lead."

(Jeff) I'm going to try this with Latin dance — salsa.

In salsa, the step cross-body lead is often used for changing positions.

It's used to add contrast to improvisational dances.

If you're not familiar with it, it might be hard to notice.

For customers with cheap seats, once again

(Laughter) I'm going to do this movement again, slowly and carefully.

Applying the fluid lead concept to this step, at the point of the cross-body lead, the lead and follow can alternate.

The follower tries to become the lead, and the lead decides to let go, so it's the opposite of a cross-body lead.

let's see it in slow motion

I'll try to recreate the dance I showed you at the beginning.

With this little twist, the dance goes from commanding to negotiating.

Who can lead, who can follow

And more importantly, it's okay to change your mind.

This is just one application of this idea, but once you've broadened your horizons, you can do whatever you want.

CA: Now let's apply the fluid lead idea to a classic waltz.

Of course, this isn't just a mechanism for changing leads, it's actually a concept that improves the efficiency of the dance itself.

So what is a waltz

A waltz is a spinning dance

So what I'm saying is that the lead person is completely blind for half the time they're dancing.

And the position of the follower is also a position, so the point is that neither of them can see where they are going.

(Laughter) Imagine if you were standing around here and it was coming toward you.

(Jeff) Guaaaa!

(Laughter) (Trevor) In fact, this blind spot causes a lot of accidents.

But what if the pair had room to switch positions for a moment?

Many accidents can be avoided

Even if one person continues to lead the whole time, with this kind of rearrangement in between, it becomes much safer to dance, and at the same time, a new form of beauty emerges in the waltz dance.

Gender is fucking irrelevant when it comes to the motion of objects.

(Laughter) (Jeff) I've performed this fluctuating lead dance on the club and auditorium stage in North America and Europe as part of "First Dance," which I co-produced with Lisa.

The audience will surely be glued

Beyond the bizarre spectacle of two men dancing together, it is a dance that has the power to move and fascinate.

Why?

The key is how Lisa found ideology in our first show.

Not only did they switch between lead and follower roles, but they also maintained their presence, their individuality, their strength throughout, and it didn't change which role they played.

I kept my identity

This is where real freedom lies, not just the freedom to switch roles, but the freedom to not be defined by which role you're playing, the freedom to stay true to yourself at all times.

Forget what a lead or follower should look like.

A manly follow or a feminine lead is fine

just be yourself

Of course, the same principle applies outside of the dance floor, but the dance floor is the perfect place to repaint the old world, to reinvigorate old relics and transform them into a better expression of the present and the way people live in this age.

Trevor: Jeff and I always dance with men and women and it's a lot of fun.

But when we dance, we're conscious that ballroom dancing has been around for a long time, and that the different kinds of identities that people embrace today will leave some people unable to express themselves, some people being ignored.

Fluid Lead was invented as a way to strip away every single concept that doesn't fit with modern people, and to restore ballroom dancing to what it's always been: ballroom dancing as a delicate art of caring for each other.

(music) (applause)

You are a senior soldier stationed in Afghanistan.

The lives of hundreds of men and women are at stake, the lives of hundreds of men and women are at stake, and the base is under attack.

Explosions everywhere in the surrounding area due to a barrage of mortar attacks.

Through the dust and smoke, I finally look up, do my best to tend to the wounded, and then crawl to a nearby bunker.

Almost half-conscious from the blast, I lay down and try to make sense of what just happened.

As your vision improves, you can see a bloody face looking back at you.

It's a horrifying sight, but you quickly realize it's not real-

The apparitions haunt me many times a day, both during the day and when I'm asleep.

I don't want to confide in anyone because I'm afraid of losing my job or being seen as weak.

This illusion has a name: Bloody Face in Bunker, or BFIB for short.

The BFIB will stay in your heart forever and secretly torment you for the next seven years.

please close your eyes

Can you see the BFIB?

If so, you are beginning to see the invisible scars of war, commonly known as post-traumatic stress syndrome or traumatic brain injury.

I didn't experience PTSD myself, but I knew about the disease.

When I was little, I used to visit my grandparents every summer.

It was my grandfather who taught me about the mental effects of combat-

When my grandfather was a Marine in the Korean War, a bullet pierced his neck and he couldn't speak.

A soldier walked past him, declared his grandfather moribund, and left him alone.

Years later, my grandfather's physical wounds healed and he returned to his hometown, where he rarely shared his experiences when he was awake.

But at night, I heard some really nasty screams coming from the downstairs room.

Even when I entered the room during the daytime, I told my grandfather not to startle or excite him before entering the room.

He spent the rest of his life lonely and silent, never speaking for himself, and I still didn't know how to lead him.

I didn't know the words to describe his situation until he was in his twenties-

I was naturally drawn to the study of trauma during my degree in art therapy.

While learning about post-traumatic stress syndrome -- PTSD -- in the classroom, my mission to help soldiers who suffered like my grandfather became clear.

Throughout the history of war, post-traumatic stress syndrome has gone by many other names, including "homesick," "soldier's sickness," "bullet stress response," and "battle stress response."

While I was working on my research, new wars ensued, and new combat uniforms and military vehicles enabled soldiers to survive blast wounds differently than they had in the past.

But invisible wounds have reached a new level, and this is what has inspired military doctors and researchers to truly understand the effects of traumatic brain injury, TBI and PTSD, on the brain.

Advances in technology and neuroimaging have shown that traumatic experiences actually shut down Broca's area and language centers.

This physiological change, called "fear-induced speech loss," combined with negative images of mental illness, combined with fear of being criticized and misunderstood, and perhaps even fear of being discharged, caused the unseen anguish of the soldiers.

For generations, veterans have struggled in solitude rather than choosing to talk about their experiences.

At the beginning of my career, I was offered a job as an art therapist at Walter Reed, the largest military medical facility.

After working for several years in a psychiatric detention facility, I moved to the National Intrepid Center of Excellence (NICoE), which is the leading facility for TBI care for soldiers on active duty.

I believed in art therapy, but I had to convince myself to try making art as a form of psychotherapy for the big, tough, strong men and the mix of female soldiers.

The results were beyond all expectations.

Vivid, iconic works of art are created by patient soldiers, and each piece tells a story.

I've found that this art therapy process can bypass speech-language brain impediments.

In making art, we access the same sensory cortex that remembers trauma.

Soldiers can create art to overcome their experiences without fear.

They then apply the language to the physical work, reintegrating the left and right cerebral hemispheres.

We've found that all forms of art can work: sketches, paintings, collages -- but the one that seems to have the greatest impact is mask making.

After all, this invisible scar doesn't just have a name, it also has a face.

Soldiers can literally grab their trauma (the mask) in their hands when they make masks.

The wonderful thing is that this often breaks through trauma and allows wounds to heal.

Remember BFIB?

This one was actually made by one of my patients, and when he made the mask, he was able to detach the image he was possessing.

Literally, it was a very difficult process for the soldier, but in the end, he began to see the BFIB not as his inner wounds, but as a mask, and with each session he wiped everything away.

We put the BFIB in the box and pushed it farther away, choosing to leave the BFIB behind when the soldier left NICoE.

A year later, he only saw the BFIB twice, and both times the BFIB was smiling, and the soldier didn't feel unsafe.

The soldier continues to draw when he is caught in a certain traumatic memory.

Every time he paints a disturbing image, he finds less or no trauma.

For thousands of years, philosophers have told us that the power to create is inextricably linked to the power to destroy.

Scientists explain that the part of the brain that remembers trauma can also be the part of the brain that heals.

Art therapy reveals how to connect them.

We asked one of the soldiers to tell us how the making of the mask affected his treatment -- and here it is.

(Video) Soldier: Consciousness shifts vaguely to the mask

My mind shifted into the painting, and then I was freed from what was holding me back, and I was able to do it.

Two days after I saw it, I was like, "What a junk, here are pictures and keys and puzzles."

From there, the treatment progressed at a tremendous speed. Everyone was surprised. What happened? What happened? Is called

For the first time in 23 years, I can actually talk about it openly with anyone.

I can tell you about it now, if you'll listen to me, because I've been set free.

just amazing

For the first time, PTSD, which had been difficult to treat for 23 years, began to progress with the treatment of TBI.

excuse me

Melissa Walker: There are over a thousand masks made over the last five years.

Really amazing, right?

thank you

(Applause) I know that if I could have told my grandfather about this process, I'm sure he would have been delighted to know that we are looking for ways to help heal the soldiers of today and tomorrow, and finding within themselves the tools we can seek to heal them.

thank you

(applause)

Let's talk about "trust"