Anyone can create their own masterpiece

try it sometime

It is fun

thank you

(applause) (cheers)

Hello, for those of you who are picky about typography, this "Hello" is written in the Bauer-Bodoni typeface.

One of the topics that's been highlighted over the last few days is the need for harmony between the "big" and the "small" -- the desires of the "big things" -- organizations, systems, nations -- and the desires of the "small things" -- individual people.

How can these two be reconciled?

I think Charlie Leadbeater made a very clear statement yesterday about the importance of involving consumers and individuals in the process of making things.

and that's what i want to talk about today

Bringing together the 'little things' to inspire and help create the 'big things' is what we believe in, and what we do through our work at IDEO.

I named the first item, after all of you in the UK, "It's all too obvious."

So often, good ideas are so natural in front of us that we don't notice them. I think a lot of the time what we do is turn the mirror up at the client and say, "Look at what's really going on."

Instead of explaining it out of theory, I'd like to show you an example.

We were asked by a large medical group in Minnesota to investigate what their patients' experiences were like.

I think they imagined, from their experience working with different consultants, that their findings would be thousands of circles, horrifying organizational charts, all sorts of map-like things with systematic stuff on them.

Or, even worse, they might have envisioned presentations that were finished with PowerPoints that consisted of eye-catching graphs and whatnot.

The first thing I actually shared with them was this

play this video until you get bored

59 seconds later

1 minute 59 seconds later

3:19

I think something's going to happen around here

5:10

5:58

6:20

They watched the video from start to finish and they had no idea what this was They watched the video from start to finish and they had no idea what this was

The bottom line is that when you're in a hospital bed all day, all you can do is look at the ceiling, and that's a very painful experience.

And putting yourself in the patient's shoes - this is the Christian I work with at Idio

He just lay down and stared at the polystyrene ceiling panels for a really long time.

that's what it means to be a patient in a hospital

And this was one of those "all too obvious"

Oh my God, so seeing the situation through the eyes of an outsider, as opposed to the way they've seen it from within an organization, was a pretty amazing experience for them.

That's why it was so suggestive for them

I was hit right away

They understood that what was needed was not a system-wide change.

It's not grand and extraordinary that you should do

It's the little things that can make a big difference

So we started working with them to prototype really small things that could have a big impact.

The first thing I did was put a little bicycle mirror on the stretcher in the hospital, so that I could communicate with the doctors and nurses as I was being transported.

Because you can see them in this rearview mirror, a little interaction was created.

this is a very small example of what they were able to do

Interestingly, the nurse took action, saying, "I agree with this policy. Let's see what we can do."

The first thing the nurses did was decorate the ceiling.

I really- I recently showed this to my mother.

I think my mother thinks I'm an interior designer.

That's right, Lawrence Llewellyn-Bowen sort of-

I don't think this is the coolest idea in the world for design professionals, but for people, it's a great idea and one that resonates with them.

What they started doing on their own -- changing the floor that leads to the patient's room, for example, so that people could say, "This is my room, it's my personal space," was a really interesting solution to the problem.

A private space was born out of a public space.

Another idea that a nurse came up with, and one of my favorites, is this: I took a regular office whiteboard, put it on the wall of the patient's room, and put this sticker on it.

This allows you to walk into a room and leave a message for the patient in that room, which is great.

A small idea made a big impact

i think this is a very nice example

Finding hints of improvement in the things around us and turning them into solutions is not a particularly new idea.

The history of invention is full of examples like this.

I made a note of the name so as not to get it wrong

Joan Ganz Cooney woke up one Saturday morning and went downstairs to find that while his daughter was waiting for the show to start, she was looking at test patterns from a test broadcast, and that's how Sesame Street was born.

As Malcolm McLean moved from country to country, he wondered why it took so long to load the ship.

invented the container

Georges de Mestral said -- those sandals don't have bugs. He's walking his dog in the fields, and he's covered in sticky bugs, little things with thorns, and that's where Velcro came from.

And finally, folks, a great British invention. Percy Shaw was driving home one night and saw a cat's eye glowing on the side of the road and invented the road reflective stud.

So there are many examples of just using your eyes, seeing things for the first time, looking at things with fresh eyes, and using that as an opportunity to create new possibilities.

The second point -- I'm not talking about religion, but this is what Buddha said, "Putting yourself on the edge and seeing things from there is a really interesting starting point."

It seems to me that narrow-minded understanding leads to narrow-minded solutions.

So using the edges of your vision to see things from a wider perspective is a very good way to look for clues to solutions.

Here's another medical example.

We start from equipment manufacturers - Palm, Treo, Idio, etc.

We've been working on a lot of fascinating technology -- they know that, and they've asked us to design a compelling device that could be used for medical diagnostics.

This is a device that nurses use when they perform spinal cord surgery in the hospital.

for data entry

They envisioned nurses clicking on aluminum devices that gadget lovers would love.

When we observed this surgery in action, and I'll show you right away, it became clear that there was a human dimension to it that they didn't realize.

When you have a 10-centimeter needle inserted into your spinal cord -- all the data that this device handles is about this procedure, and it's meant to ease your pain -- the patient is terrified and terrified.

So the first thing all nurses do in this situation is to hold the patient's hand to reassure them, which is a human behavior -- and that makes it completely impossible to use both hands to enter data.

So what we designed was a lot less glamorous, but more human and practical.

It didn't look like a palm in any way, but it had thumb scrolling, and you could do everything with one hand.

Again, it's a small idea that focuses on human behavior that drives the design of this product.

i think this is very important

Again this "workaround" idea

We use that word a lot, it means to look around, and at TED, I was watching these kinds of things happen around me.

We often see ideas about how people can piece together solutions in their everyday lives, and things that we do in our environment that are somewhat unconscious, but with enormous potential.

We've been talking lately about 'action without thought? I wrote a book called Have you got your hands on it yet?

It's a book about the actions people do without thinking about it, and the bigger intentions and the bigger opportunities.

why do we all walk along the lines drawn on the road

This is a picture of a Japanese subway

I'm conscious of imitating people, even if I don't know why I'm doing it.

Why do you put square milk cartons on a square fence?

Because in a way you have to - you can't help it

I don't know why, but I do

Why do you wrap the teabag string around the handle of the cup?

Again, we're using the world around us to create our own designs to solve problems.

We always tell our clients, "You should see this."

They say, "It's really important. It's essential."

This means that people are designing their own experiences.

Here's what we can learn

If there's a pole in the street, I assume it's okay to leave the shopping cart there.

In a way, it's there for us to use.

We choose the environment around us to do all these things.

And so with other experiences -- we choose one and transform it into another, and so with other experience -- we choose one and transform into another.

One of my favorite examples is something my mother used to say, "Just because your sister jumped into the pond doesn't mean you shouldn't."

In fact, everyone does it. They always follow other people.

We assume that if someone does something, we are allowed to do it.

Signs like this are all around us almost all the time.

For example, a shopping bag means "parking meter out of order."

We can all read such signs.

We all communicate with others in very visual ways, without even being aware of what we're doing.

And the third point is about this idea of ​​"I don't know," where you consciously reject your own point of view.

I talk all the time about the "no idea" situation.

Think of yourself as a beginner, remove your preconceived notions, and look at things with a fresh mind.

One of my friends was a designer at IKEA, and his boss asked him to design a storage system for kids.

This is the Billy bookshelf, the best-selling product at IKEA.

If you're like me, assembling this bookshelf will be a pretty difficult task.

But this is a bookshelf that sells very well. How can we make a children's version?

When you look at children in person, you realize that the way they think about storage can be tricky.

Children assume very different angles of what they can do.

Children spend their time above and below

They spend their time surrounded by things, and their relationships with their perceptions of space and their ideas about storage are very different.

So the first thing we have to do is -- this is Graham, the designer, and put yourself in the shoes of the kids, so he's sitting under his desk.

what came out of this

This is the storage system he designed

I can hear you say what is this, no I can't hear you

(Laughter) It's something like this. I think it's a very good design.

As you can see, this is a completely different angle on the situation.

It's an empathetic solution, although bears won't like it.

(Laughter) This is a really good way to recapture the mundane, and that's one thing.

And put yourself in that person's shoes, and this is one of the topics of this conference, how do you put yourself in that person's shoes and feel like that person, and then afterwards.

It's about how you use that information to come up with a solution.

I think this is a great example of just that.

Last point, I'm sure you all have green bands.

This story concerns the green band

"Pick a small battle that's big enough in terms of leverage and likely to be won."

This is one of the themes that has been emphasized at this conference. This has been one of the themes that has been emphasized at this conference. Where to start How to start What to do to start

We were commissioned by a Kenyan company called ApproTEC to design a pump.

It is now a company called KickStart

And as a designer, I spent a lot of time figuring out the shape of the pump to make it really beautiful.

I was totally wrong

If you put yourself in the shoes of the people using this pump, the fact that this pump is collapsible and can be carried on a bicycle becomes more important than its shape, and this pump is made in local ways and from local materials.

So we had to look at everything from the user's point of view.

we had to put ourselves completely in their world

So what seemed like a rugged product was actually incredibly useful.

It's kind of like a stepping stool, and when you step on it, it acts as a pump.

Children can use it Adults can use it Anyone can use it

It turns them into -- and this is one of the themes -- entrepreneurs.

they use this very well

We won a lot of awards for this design and we had a great experience. We won a lot of awards for this design and we had a great experience.

We've managed to reconcile the needs of the design firm with the needs of the individuals within the firm, taking pride in the products we've designed and meeting the needs of the people who use them.

This pump is spraying water from a height of about 10 meters.

So, as a final action, I handed out green bands to you this morning. So, as a final action, I handed out green bands to you this morning.

We've donated "getting started" funds to your next project on KickStart on your behalf.

Donating money to the things I've been talking about

I feel that this is a very important action.

So small things become new big things

I hope you like it That's it Thank you

I hope you like it That's it Thank you

(applause)

What I want to talk to you about today is the trajectory of how ideas about nature have changed architecture over and over again.

What's interesting about architects is that they've tried to justify beauty by dealing with nature -- beautiful buildings are undeniably always modeled after nature.

For nearly 300 years, there's been a heated debate over whether the proportions of 5 or 7 are better for architecture - because the nose is 1/5th the size of the head - and the head is 1/7th the size of the body.

The reason is that before the 16th century -- before the decimal point was invented -- people had no choice but to use fractions to measure the size of buildings. As a result, rooms were divided into quarters of the front of the building.

The decimal point was invented in the 15th century - architects stopped using fractions in favor of a new model of nature.

Today, we're using natural models, using digital tools based on calculus, which are rich in beauty, our obsession with form, and a lot of our obsession with nature.

The best example is the Gothic style, which was conceived after the invention of calculus - but the Gothic architects didn't actually use calculus to design.

The important thing is that for the first time in architecture since the Gothic period, structural mechanics was considered as a factor in determining the shape of a building.

If you take Christopher Wren's King's Cross as an example, you can really see how the vaulted ceiling beams are laid out like lines to express the shape of a strong structure.

Much later, Robert Maillard's bridge - rationally structured, almost parabolic, with a calculated curve.

The hanging chain was designed by Catalan architect Antonio Gaudi.

In terms of technique, in the late 19th and early 20th centuries, the hanging chains were copied onto arches and domes.

Structural mechanics determine the shape in all these examples.

Frei Otto started using the soap bubble diagram - using bubbles as a model to create the Mannheim Concert Hall.

What's interesting is that over the last decade, we've worked with structural engineer Chris Williams to create the roof of the National Gallery, using a technique that could be described as a heat transfer model.

All of these examples were conceived of in one idealized form - structural mechanics.

As an architect, I feel there are limits to this kind of structure, because I'm not interested in ideal forms -- nor are I interested in optimizing for perfect efficiency.

What I want to bring up is that whenever you think about nature -- and every time you think about it, you have to think -- it's basically just another component of the general shape that came out of the process of genetic evolution.

My hero isn't Darwin. He's the father of Gregory Bateson, named William Bateson, and he lived in Monterey for many years.

He was called a "geneticist" - he looked at malformations and mutations rather than standard ones and tried to find rules and laws.

Rather than trying to find an ideal type or an ideal mean, he always looked for exceptions, and for example -- in what is called "Bateson's Rule" -- there are two mutations in this thumb.

When I first saw this photo 10 years ago, I found it both beautiful and strange.

beautiful because it has symmetry

What he found in all the cases of thumb mutation was that instead of the normal thumb, there was another thumb facing each other, or four fingers.

Now the mutation has symmetry.

And Bateson came up with the concept of "symmetry breaking," which says, "In any case, if we lose information about the system, we revert to left-right symmetry."

As an architect, I've always believed that symmetry is not a sign of direction or composition - symmetry is a lack of information.

Every time we lose information, we fall into symmetry, and every time we add information to a system, we destroy symmetry.

At that moment, the whole speculation of natural shapes shifted from looking for the "ideal shape" to looking for the combination of the "genetic shape" and the "information."

Literally looking at the image -- understanding Bateson's work -- we started using symmetry breaking and division theory when thinking about building shapes.

I'm going to talk a little bit about how the digital media we use today integrate calculus, but the fact that the tools are based on calculus means that you don't have to think about the dimensions of the ideal unit or the individual elements.

In architecture, we're dealing with large-scale component-complexes, but let's say, for example, in this room you're in right now, there are 50,000 individual components, and they all need to be organized.

So the typical idea is -- you think they're all the same, and you're sitting in a chair that's all the same size, right?

Of course, I haven't verified this, but it's normal that all the chairs are slightly different dimensions, because you need space for everyone's line of sight.

The elements that make up ceiling grids and lighting – losing their solid dimensions and other qualities – move to increasingly granular dimensions.

It's because we use calculus tools during the manufacturing process and the design process.

You could say that calculus is the mathematics of curves.

Even a straight line is a curve when defined in calculus.

It's just a curve with no bends

The new knowledge of shape is now spreading across all fields, in automobiles, in architecture, in industrial products, and in many other places where digital tools for curves have had a major impact.

The scale that comes out is complex -- take the nose of the face, for example -- and there's this idea of ​​"fragment to whole."

In calculus, the notion of subdivision is more complicated, because each part is an unbroken continuum as a whole.

It's too early in the morning for a calculus lecture, so I brought up a picture to show you what's going on.

This is our Korean church in Queens.

In this example, you can see a repeating pattern in the components of this staircase - repeating without the underlying structure.

Each member of this structure has its own unique distances and dimensions, and all the joints have different angles.

We were able to design and build this because we used the calculus definition of shape.

This structure is so dynamic that when you walk through it, you can see the same structure either closed or open, because of the built-in vectority of movement.

So the same space can appear closed, and from the other side, it's an open view.

Also, you can feel the visual movement in the space, because the pattern of all the components is changing, and that pattern guides your gaze towards the altar.

I'm starting to notice that that's one of the main changes -- in architecture -- rather than the "ideal shape" of a church's Latin cross -- it's actually a hallmark of a church -- that invisible, behind-the-scenes light directs you toward the altar.

It turns out that designing sacred places isn't the latest science.

You just have to incorporate a specific genetic idea --

Each of them has a different view inside - a very complex combination of simple structures.

In terms of "architecture" and "manufacturing" -- this is a residential complex built in Amsterdam in the '70s -- about a kilometer long --

We've segregated 500 apartments - so that we can distinguish the neighborhoods as small neighborhoods.

I won't say much about these projects, but -- along the exterior of the building -- you can see the escalators and elevators that move people around -- it's all supported by 122 pairs of truss structures.

On an escalator - when you're carrying people, all the trusses are loaded diagonally.

Each one of them is constructed in a slightly different way as you go down the whole building.

Together with Bentley, we've created software that uses Microstations -- to network all the members -- to group information together, so that if you change any member of the building -- that change will not only affect each truss, but it will go through all the truss structures -- and thus the entire building.

It's a calculation for every component of the building we design—

Steel-to-steel joints and -- counting other steels -- tens of millions of times.

That calculation gives us an integrated harmony between all the pieces - from one piece to the next.

This idea led me to do product design, and I work for Vitra, a furniture company, and Alessi, a design company that's involved with architects.

This method is useful for problem solving. Even if you change the parts, you can integrate the whole.

I don't mean to criticize or praise BMW, but let's take BMW as an example.

In 2005, they needed to give all their car models a distinct identity.

The 300 Series, the latest model -- the 100 Series, which just debuted, had to look like the 700 Series.

At the same time, there are people who are paying $30,000 for a 300-series car, and there are people who are paying $70,000 for a 700-series car, and people who are paying more than twice as much - they don't want their car to look like a low-end car.

So they also needed to differentiate between their products.

So as we tried to allow more design options in manufacturing, this whole-and-parts problem got worse.

The relationship of the part to the whole, in my view as an architect, is becoming more and more of a corporate concern in product design.

The first product test we did - at Alessi - was a coffee and tea set.

I knew from the beginning that it was going to be an incredibly expensive coffee and tea set, so I went all the way south to San Diego to meet some people I knew and used the titanium explosion molding process that's used in the aerospace industry.

Basically, what we can do is cut a graphite mold, put it in an oven, heat it to 1,000 degrees, gently inflate the softened titanium, and finally blow it up to shape it.

The great thing about this method is that molding is only a few hundred dollars.

Titanium costs thousands of dollars, but it's very cheap to mold.

So we designed eight -- interchangeable curves -- that are very similar to the house design, because they can be recombined -- always ergonomically shaped -- and yet manufactured the same way, with the same volume.

So you put hundreds of dollars into each tool - and you get an amazing variety of components.

This is one example of that set

What was important to me -- this coffee set -- it's just a coffee pot and a teapot. It's set on a tray, but -- they're consistent. Greg Lynn Alessi's coffee pot -- and when you buy it, you've got -- in a way, a one-of-a-kind product.

So coming back to architecture, being organic for architecture as a field -- unlike product design -- holistic and rigid -- is all about the problem, and it's exactly our domain.

We need a coherent design as one piece - but we also need a subdivision into smaller rooms, and we need both large-scale and small-scale features.

Architects tend to be driven by traits, and architects need traits -- traits that span the entire building, even skyscrapers -- that's what we're good at -- maintaining traits -- the convergence of things -- shapes, structures, windows, colors, patterns, relationships, so to speak -- that's the real architectural problem.

My favorite thing in nature is - tropical frogs.

What intrigued me about them -- the extreme texture examples -- well, let's call them decorations.

A change in shape results in a change in color pattern

Patterns and shapes aren't the same, but they work together and blend in a way.

When I worked on a national park center in Costa Rica -- we tried to use color gradations and textures -- as if the structure were crossing the surface of the building.

We also tried to create a continuum of change from the main exhibition hall -- to the Natural Science Museum -- so it's a continuum of change -- but within that mass are different spaces and shapes.

In the house we're working on in Valencia, Spain -- the towers of the different houses are fused together by a shared curve into one big mass that looks like a monolith -- but they can also be broken down into individual pieces.

And you can see the change within the block -- and the 48 apartments, each with their own shape and size -- always within controlled limits, sort of -- within the enclosure.

we work with a group of other architects

It's a company called United Architech-

was a finalist in the design of the World Trade Center.

I hope you can see how we are tackling large-scale construction problems.

We were thinking of building a kind of Gothic cathedral on the site of the World Trade Center.

To do that, we tried to combine five towers into one system.

And we've seen many examples since the 1950s of other architects trying to do something similar.

We really approached it at the building typology level, and built these five separate towers -- and linked them all together at 60 floors -- into a monolithic mass.

At United Architech, we had a similar system -- we proposed -- for the European Central Bank Headquarters -- but this time we turned it into a more monolithic mass, like a sphere.

Again, you can see that the many building elements - in a very organic way - are separated into smaller parts while forming a whole in an organic way.

Finally, I'd like to show you some effects using digital molding.

About six years ago, I bought a CNC machine -- so often when young people were making models -- to avoid cutting their fingers.

And I also bought a laser cutter, and I started machining large-scale building components and models in my workshop, where I have immediate access to machine tools.

It turns out that machine tools, if you tweak the software, can actually create decorative effects.

So for interiors like the walls of a store in Stockholm, Sweden, or a facility at the Dutch Construction Institute, we used the textures created with this machine to create a variety of spatial representations, integrating the textures and shapes of the wall elements.

Even at the level of vacuum-formed plastic, fiberglass, and structural steel that can be considered flat and modular.

Steel has historically taken precedence over the design industry, and if we can take advantage of this, we can think of it as taking beams and columns as a system, and it's going to be much more efficient -- and yet very beautiful and organic -- to create decorative and formal effects.

thank you

I've been told online that I'm a design evangelist.

This is too lofty I'm like a wanderer

I've been walking around cities looking for designs everywhere.

I take about 5,000 photos a year, and I decided to take the interesting ones, edit them, and show them to you.

There were three criteria for selection: one, sophisticated design within reach, and two, free stuff. In the design industry, it's not out of reach, as the design industry is known to be, but designs found on the street are free and accessible to everyone.

This is the sidewalk we found in Rio

A popular design in the 1950s

It's a fluid, organic pattern that fits Brazilian culture. Good design enriches the culture.

It doesn't look like San Francisco or New York.

This is my favorite information highway. In the analog world I live in, pedestrians come and go, they interact, diversity comes and goes. I believe that the simple things underfoot mean a lot.

the reason i started this job

I've been a ceramic designer for about 10 years, and I've always been interested in utilitarian design, the little textures and color schemes in everyday, mundane pieces.

So I started a company called Design Within Reach, which does simple design products and sells not only great designers, but their traits and personalities, and so far it's been successful.

For the first few years of my career, I traveled around Europe in search of design.

In Amsterdam, I was struck by something, when I was talking to a number of designers in a design store, and most of them were very similar, and I realized the wave of globalization that is sweeping the design industry.

I'm sure you all know the world of design, and it's getting harder and harder to find designs that reflect your own culture.

Walking around Amsterdam, what caught my eye was not the merchandise in the design store, but the exterior, the street. It goes without saying that cities untouched by modernism retain their unique architecture and atmosphere.

Now, I publish a weekly newsletter, and when I wrote about it, it got a lot of attention. Mundane design in public spaces is an important platform and a form of dialogue for communities.

So I spent a lot of time looking for designs, like Basel, where Vitra is located, or northern Italy, and when I look back at European cities, there's always a lot of bicycle and pedestrian streets, and I've come to think that these cities must have some important design element related to bicycle and pedestrian traffic.

No one would call this a designer bike. Designer bikes are made of titanium and molybdenum.

But I thought there was something new about the design of places like Amsterdam, and the essence of design was utility.

So we redefined this as a design paradigm, not a designer bike.

Since this experience in Amsterdam, I've spent a lot of time looking for common denominators in unsigned designs all over the city.

I recently visited Buenos Aires to see this bridge by Santiago Calatrava.

he's a spanish architect and designer

I went to this bridge by following a tourist guide.I like the figurative, symbolic and structural elements of the bridge.

And what I've discovered is that design often fails to meet the expectations of what you see.

But there was something else interesting about this area, this is what you would call a development area, and there were a lot of buildings under construction.

From a distance it looks unremarkable, but when you look closer, you'll notice beautiful patterns that remind us of Mondrian and Diebenkorn.

But this is an example of how even industrial materials can unintentionally become a bit of a still life when you add a little bit of color and vibrancy.

If you get closer, you'll see a different aspect

It's refreshing to see these little designs created by chance.

These works of art tell us something of the mortal logic that when a building is completed, it's never going to look as beautiful as this simple scaffolding.

A little further on, I found a structure that was pleasing to the eye, vertical and horizontal lines, diagonal lines of little decoration, red-purple curving lines, and workers added decorations, and it was as if a painting had appeared in the middle of the city.

You won't see this sight anymore

Finding a still life to capture this moment is like listening to music or something, and that's what I love about it.

Antoine Pridock designed an amazing baseball stadium called Petco Park in San Diego.

Local materials are used abundantly, but you can see the interior-like structure inside.

Some people come to watch baseball, but I go to see this design.

Vertical trees provide an architectural break.

red usually implies "stop"

Emotionally embracing red draws attention, and it feels like she's staring back.

This is an Italian no-go tape.

This is a construction site in New York City, and the color red has an appealing power to match the cuteness of this puppy.

This is a side street in Italy

I'm also drawn to red for mailboxes, door services, plumbing -- optimistically, it's like a different utility.

It looks like you're working on a design.

For some reason the Italian ones look good

Even the menu on the wall looks balanced.

I think this is because I'm walking around the back alleys and such.

Red is also comical, and draws enough attention to this poor Havana fire hydrant that was buried due to a design flaw.

Even simple blocks and materials come to life when they have color.

I will stop and take pictures

symmetrical beauty

straight line versus curve

Here's my impression of benches in New York City.

I've also run into protective posts that have interesting interpretations, how can I say that.

This is an alleyway in San Francisco, and a trash can that's been abandoned for the last 18 months has been nicely angled at a 45-degree angle and blended in with its surroundings to create a work of art in an empty parking lot.

In this way, wherever we go, there are naturally created works lying around.

Havana is a wonderful place

No commercial invasion, no brand names or logos, no physical sights.

This is a protective post for a pedestrian zone, but it's a repurposed colonial-era cannon.

Cuba has import restrictions, so we need to use alternatives, but it's also a great playground.

I once thought about why Italy is the leader in modern design.

In my specialty, furniture, I'm the absolute leader.

Holland isn't bad, but Italy is great.

We found this little street in Venice, where the communist headquarters shares a wall with a Catholic temple.

And then I realized that in a place called Italy, we recognize different ideologies and diversity, and we don't see it as a problem, and we sometimes ignore it.

As you can see in this photo, the past and the present are in harmony in Italy. This has a huge impact on culture. Public spaces and sidewalks are protected, allowing us to see these objects firsthand. This is how Italians can overcome the fears of modernization and other fears.

By the way, this is a street in San Francisco.

This landscape, if you ask me, is a peculiar discipline of the city.

I walk a lot, so I've noticed that businesses are ruining public spaces here.

I saw this and thought, "Some of the publications that deal with urban issues can cause problems." Think about it, folks. Social policy can't change these things. Businesses should take it seriously.

Italy is another place where you can see this very clearly. Just by selling magazines, you can see very clearly how the environment is being managed.

I walk or ride my scooter to work, and I park in this little alley.

The other day, when I went to work as usual, the parked bikes were all red.

I wouldn't be surprised if you use Photoshop or anything like that, but this time, when I stepped off the scooter, I was really surprised to get the impression that the bikers were banding together and colluding in some way.

It reminded me that we should always be prepared for these kinds of encounters.

So I thought, if it's Yellow Day, in San Francisco, you can all agree to create an installation.

But it's also a reminder of the compelling power of patterns and repetition.

I don't think there's a more powerful technique than a pattern that connects different components.

In December, I visited an art show in Miami, and I spent a few hours looking at the artwork, and I was amazed at the price, although I enjoyed the viewing itself.

When I went outside, the wall of the parking service was filled with car keys, and it was a nice little collage.

If patterns have the power to connect disparate elements, the possibilities are endless.

The reason I don't often take portraits of people is because it gets in the way of the natural design.

Now, we happened to be having lunch in a Spanish restaurant on a sunny day when we were the only customers. We were drinking wine, enjoying the local culture and food, and just as we were feeling very lucky that it was so quiet, a group of tourists disembarked from the bus and poured into the restaurant en masse.

In the blink of an eye, a big man yelled out, and the atmosphere changed completely.

That's when the sun started to come out, and through the perforated awnings, a pattern of light was projected onto the tourists, creating a backdrop for the people.

Now, I believe that patterns have the power to eradicate the roots of evil in society, such as bad-tasting restaurants. But seriously, this is a glimpse into the dominant side that industry has, to a greater or lesser degree, created.

The last picture I'm going to show you is again about sidewalks, but let me just add a little bit of optimism.

After World War II, many urban areas were devastated by the spread of automobiles.

In urban areas, all you see are randomly generated parking lots.

Urban design was controlled by the Ministry of Transport, and it's easy to blame the cars, but I disagree.

But over the last few years, we've seen these changes, and there's been a renewed awareness of the importance of the urban environment as a center of culture.

I believe that our commitment in the public sector is a contribution to the greater whole.

Urban areas are places of constant interaction and change, where art and inspiration are born.

everyone carries their feet

But at the same time, there seems to be a recognition of the dignity of urban areas.

Places like Chicago have gone international.

The United States is becoming a leader in urban planning and renewal. So let's take Chicago as an example. Chicago Mayor Daly is a hero in the design world.

A shopping street in a city like this - you know the flower boxes on Michigan Avenue cost money, don't you? But when you actually go there, you'll find that each street has its own flower box, and there's a wide variety of plants.

I think it's wonderful that a city organization can grow so many kinds of plants.

That same element that you see all over Chicago is called Big D Design, Frank Gehry's Fritzker Pavilion.

The reason I think this design is important is not because of its appearance, but because it serves an important function in society.

For example, free concerts are often held in this area, and the sound system is excellent.

But the public outreach that the city has done is so important that it's almost international norm.

I'm an international design consultant on the San Francisco Mayors' Commission, and Chicago is considered the top, and I'd like to salute Mayor Daly and others for that.

In order to include one related to technology,

I chose Chicago's Millennium Park, created by Spanish designer Plensa, for digital displays that reflect the personalities and personalities of the people in this area.

I think you've done a good job of embracing diversity and expressing it well.

It's an area of ​​leadership, and Chicago is just one example.

thank you

"The Road Not Chosen" by Robert Frost In the yellow woods, the road diverged into two paths Unfortunately it is not possible to go both, I am a single traveler I paused for a long time and saw one road as far as I could, until it turned in the shadow of the undergrowth Then I took the other road which seemed equally good and more appealing For it was overgrown and untrodden But perhaps it was not much different in that regard And neither road was much different that morning It was covered with fallen leaves that were not evenly trampled

I saved the first road for another day! But the road leads to another road, and I didn't think it would come back.

One day, many hours later, I'll say with a sigh, "In the woods the road split in two, and I took the less-traveled one, and that made all the difference."

Will what we build now be considered a marvel in the future?

Think Stonehenge, Pyramids, Machu Picchu, Easter Island.

All of them are very different from modern architecture. They're built in complex and seemingly illogical ways, with lots of huge boulders, and they're shrouded in mystery because there's nothing left to show how they were built.

It's hard to believe that it was made by humans, which is why it's not made by humans.

Carefully crafted by primitive giants, yes Cyclops.

(Laughter) I've been working with these giants to learn the secrets of moving boulders.

Actually, Cyclops wasn't all that strong either.

They're just very good at making the most of their material.

Now, the big stone-like, undulating creatures you see in the video are the result of this collaborative effort.

Well, Cyclops may be a fictional creature, but these amazing structures are real.

made by human hands

At the same time, it created a mythology around it, where myth and reality are so strongly linked in this marvel.

For example Easter Island

When the Dutch expedition first encountered the islanders, they asked the Rapa Nui people how their predecessors carried the colossus.

The people of Rapa Nui said, "The ancestors didn't move the statue. The statue walked by itself."

It's been forgotten for hundreds of years, but it's true.

The statues, known as moai, were carried while standing, rotating from side to side.

May I?

Moai are spectacular even to modern people, but imagine back then, giant moai statues roaming the islands.

The true monument was not the statue itself, but the cultural ritual that brought the stone to life.

As an architect, I've been chasing this dream.

How can we change the way we think about architecture and embrace the mystical side?

So I've been challenging myself with a performance, a simple, age-old task of making a big, heavy object move. This five-meter boulder was designed to walk on the ground and stand upright.

And what we've found is that by thinking of architecture as a performance, not a product, from conception to completion, we can rediscover clever construction methods that still work today.

When we talk about the future, it's all about technology, efficiency and speed.

But what I've learned from Cyclops is that wonders can be smart, they can be grand, they can be sustainable, because they're massive, they're mysterious.

People still want to know how ancient wonders were built, and I'm asking Cyclops how to create a mystery that makes you say, "How?"

In an era where buildings are designed to last 30 or 60 years, I want to know how we can create something that will entertain us forever.

thank you

(applause)

Now let's get started

(music) (singing) It's okay to be gay

It's okay for everyone to be different

Boy or girl, don't worry about it 'cause we're all part of a big family

gay means "fun"

Queer Kid Stuff

You can be yourself here at Queer Kid Stuff

(Applause) Singing a song that starts with the words, "It's okay to be gay" like this in front of an adult is completely different than singing it in front of a kindergartener.

This song is the theme song for my web show, "Queer Kid Stuff," which talks about LGBTQ+ and social justice to people of all ages.

And when I say "people of all ages," I mean literally everyone from babies to great grandmas.

I know what you're thinking right now, "Uh, are you talking to your kids about gays?"

But it's important to talk to children about sexuality.

According to the American Academy of Pediatrics, children have a distinct gender identity by the age of four.

Four years old is a period of ego growth.

Children observe the world around them and absorb a lot of information and absorb it into themselves.

Many parents want their children to grow up to be kind, empathetic, and confident adults, and exposure to diversity is important for social and emotional development.

There are transgendered children, transgendered children, transgendered, transgendered queer parents everywhere.

On the show, I talk with my teddy bear about the LGBT community and political activism, about gender and pronouns, about consent and body affirmation.

I'm going to present these topics in a song, using definitions and metaphors that are easy to understand, like the song I just sang.

We talk about these topics from, in the words of my mentor, "under the doorknob." Put yourself in the eyes of a toddler, look up at a world so big with those little eyes of a toddler, and simplify seemingly complex ideas.

Gender is how you feel and how you express yourself.

Sexuality is love, gender, family, not sex.

These are all things that even a child can understand.

In an early episode about gender, I emphasized the definition of pronouns by talking about what they are, and introduced gender-agnostic terms like "they" and "them."

I encouraged the children to think about the pronouns they would like to use and ask other children.

Later episodes used this knowledge to introduce important terms like "nonbinary" and "transgender."

I get emails from viewers who are in their 20s and say that they used my show to explain nonbinary gender to their grandparents.

But there's a comment that's said over and over again, "Children should be allowed to remain children."

I think that's a nice feeling, but does that "kids" include all children?

Just a few weeks ago, a 15-year-old from Huntsville, Alabama, was bullied for being gay and committed suicide.

In 2018, a 7-year-old child from Denver, Colorado also died.

There have been and will continue to be many such children.

Lesbian and gay bisexual youth are three times more likely to attempt suicide than heterosexual youth, and transgender youth are nearly six times more likely to attempt suicide.

One study found that about one-third of homeless youth are lesbian, gay, bisexual, or unidentified, and about four percent of homeless youth are transgender, compared to 1 percent of the youth population as a whole.

According to the Human Rights Campaign Foundation (HRC), there have been a whopping 128 murders of trans people in 87 cities in 32 states since 2013.

And only reported cases

Eighty percent of those victims were transgender women of color.

The situation for queer people is hopeless, to say the least.

It's a similar situation with comments on my YouTube videos.

I'm used to harassment

On a daily basis, I receive messages like, "You're a lolicon," and so many different ways to commit suicide.

I once blocked the word "truck" because someone told me to be hit by a truck and die.

So are "showers" and "ovens," which were used for nasty harassment that alluded to the Holocaust.

When the neo-Nazis marched in Charlottesville, I wasn't too surprised to find that the person who posted the offensive meme about the show on a message board called Reddit was in the torch gang.

We're faced with this barrage of negativity: heartbreaking statistics, violent behavior and psychological risks, as well as those regretful, well-meaning statements my parents made when I came out: "I didn't want you to have a hard life."

I am facing these

But even in the face of such anguish, I choose to have fun.

Choose rainbow or unicorn glitter, and sing "It's okay to be gay" with your old teddy bear.

I'm talking about queerness for kids because that's what I was looking for when I was a kid myself.

I don't want other people to go through the kind of pain that I went through.

I want to express this in a fun and positive way, and I won't judge life as queer as difficult.

I want my children to grow up proud of who they are and what they can be. It doesn't matter who they love, what they wear, or what their pronouns are.

And I want you to be able to love people not because they are different, but because they are different.

I believe that by fostering this kind of pride and empathy, we can make the world a kinder, more equal world, and confront the prejudice and hatred that is plaguing it.

So talk to your child about gender.

talk to your child about sexuality

Teach Consent

Please tell me it's okay for boys to wear dresses and girls to raise their voices

Spread the joy of living queer yourself

thank you

(applause)

Deep underground in the geysers and hot springs of the Yellowstone caldera are magma chambers created by hot spots in the mantle.

As magma moves toward the surface, it crystallizes into new hot igneous rock.

The heat of the rocks pushes groundwater to the surface.

As the water cools, the ions precipitate and form crystals, such as quartz, which is composed of silicon and oxygen, potassium, aluminum, silicon, feldspar, which is composed of oxygen, and galena, which is composed of lead and sulfur.

Many of these crystals have distinctive shapes, such as pointed needle-like quartz or cube-stacked galena.

But why does it repeat like this?

the key is in the atom

The atoms of the crystal are arranged in an orderly repeating pattern.

This pattern is the defining characteristic of crystals, and it's not just minerals: sand, ice, sugar, chocolate, ceramics, metals, DNA, and even some liquids have crystalline structures.

The arrangement of atoms in crystals can be roughly divided into six types: cubic system, tetragonal system, orthogonal system, monoclinic system, triclinic system, and hexagonal system.

Under the right conditions, crystals grow into geometric shapes that correspond to the arrangement of their atoms.

In the case of galena, it has a cubic structure and is composed of lead and sulfur.

The relatively large lead atoms are arranged in a three-dimensional lattice that touches each other at 90-degree angles, and the relatively small sulfur atoms fit nicely into the interstices of the lead.

As the crystal grows, sulfur atoms are attracted to these sites, and lead atoms attach to these sites.

Atoms bonded in this way form a lattice.

The 90-degree lattice structure of the galena crystal is reflected in the crystal's apparent shape.

Quartz, on the other hand, has a hexagonal crystal structure.

When viewed on a plane, they are arranged in a hexagonal shape.

Stereoscopically, this hexagon is made up of many pyramids, each made up of one silicon atom and four oxygen atoms.

The characteristic shape of quartz is a hexagonal prism with a pointed tip.

Many crystals can adopt multiple geometric shapes depending on environmental conditions.

Diamonds, for example, form deep in the mantle, but have a cubic crystal structure and grow into cubes or octahedra.

Which form it takes depends on the conditions under which it grows, such as pressure, temperature and chemical environment.

Although growth conditions within the mantle cannot be directly observed, laboratory results tend to be cubic at low temperatures and octahedral at high temperatures.

The presence of trace amounts of water, silicon, germanium and magnesium also affects the shape of the diamond.

Diamonds don't naturally grow into the shapes you see in jewelry stores, they're artificially cut for brilliance and clarity.

Crystals may or may not form depending on environmental conditions.

Glass is made from molten silica sand, but it doesn't crystallize.

Because the glass cools relatively quickly, the atoms don't have time to align themselves into the ordered crystal structure of quartz.

The disorderly arrangement of the atoms in the molten glass becomes fixed.

Many crystals don't form geometric shapes because they grow in a mixture of other crystals.

Rocks like granite contain a lot of crystals, but they don't have any recognizable shape.

As the magma cools and hardens, different minerals crystallize at the same time, quickly filling the gaps.

Crystals like turquoise, even with enough space, do not grow into any discernible geometric shape under most environmental conditions.

Each crystal's structure has its own unique properties that, while unappealing to human sensibilities, are useful in materials science and medicine.

Today, I'd like to talk to you about how reading can change our lives, and about its limits.

I would like to talk about how reading can bring us a shareable world of powerful human bonds.

Of course, that connection is only part of the story.

There is no doubt that reading is a solitary and unique activity.

The person who changed my life was the great African-American author, James Baldwin.

When I was growing up in West Michigan in the 1980s, there weren't many Asian American writers interested in social change.

I think they turned to James Baldwin as a way to fill this void and be racially aware.

But at times, I felt provoked by his words, perhaps because I knew I wasn't African-American.

In particular, he said, "There are liberals with good attitudes, but none with real convictions.

Even if I try to rely on him in an emergency, for some reason he's not there."

somehow not there

I took the word literally

Where shall we go?

I headed for the Mississippi Delta, one of the poorest areas in the United States.

A place shaped by a strong history

In the 1960s, African Americans risked their lives for education and the right to vote.

I wanted to be part of this change by helping young people get out of high school and into college.

When I arrived in the Mississippi Delta, it was still poor, segregated, and in desperate need of change.

The school I arrived at had no library, no guidance counselors, and police officers instead.

Half of the teachers were temporary teachers, and when students got into fights, the school would send them to the county jail.

I met Patrick at this school

He was 15 years old, but he repeated two years and was in the eighth grade.

He was a quiet, introspective boy who was always lost in thought.

he hated it when someone got into a fight

On one occasion, he intervened in a fight between two girls and got beaten up himself.

Patrick had only one problem

I don't want to come to school

He said school was so depressing because everyone was fighting and the teachers were quitting.

Also, the mother worked two jobs and was too exhausted to send her son to school.

So I decided to bring him to school.

I'm a reckless 22-year-old and extremely optimistic, so my strategy was to go to his house and say, "Let's go to school."

In fact, this strategy worked, and he started going to school every day.

started to stand out in class

he wrote poetry and read

came to school every day

I got accepted to Harvard Law School around the same time that I figured out how to get along with Patrick.

I faced the same problem again Where should I go?

And I thought, the Mississippi Delta is a place where people with money and opportunities are leaving.

It's the people who don't get the chance to get out who get left behind.

i didn't want to leave

i wanted to be the one to stay

On the other hand, I was lonely and tired.

So I convinced myself that a prestigious law degree could make a bigger difference.

i left town

Three years later, just before graduating from law school, a friend called me to say that Patrick had gotten into a fight and had killed someone.

i was speechless

I had mixed feelings of disbelief and a feeling that this was real.

i went to see patrick

I went to visit the prison

he said it was true

you killed someone

I didn't want to talk about it

I asked him what happened to school, and he said he dropped out a year after I left.

and still said something

He looked down and said he had just had a daughter.

I felt that I had let my daughter down.

There the conversation cut off awkwardly.

When I walked out of prison, I heard my heart say, "Come back.

If you don't come back here now, you'll never come back."

So I graduated from law school and went back.

I went back to see Patrick to see if I could get him some legal help.

During our second meeting, I had a good idea: "Patrick, why don't you write your daughter a letter so that she can always remember it?"

Giving him pen and paper, Patrick began writing.

But when I saw the letter he returned, I was shocked.

I couldn't read what he wrote, even simple spelling mistakes.

So I thought, as a teacher, I knew my students could grow so dramatically in such a short period of time, but I never imagined that they would forget so quickly.

What hurt me more was what Patrick wrote to his daughter.

She wrote, "I'm sorry I can't be with you. Forgive me, Daddy."

I could only say this

I asked myself how I could convince him that there were things he didn't need to apologize for and that he should have said more.

I wanted her to feel that she had more to share with me.

After that, I visited every day for seven months with a book.

My tote bag became a mini library

I see James Baldwin as Walt Whitman C.S.

I took Lewis with me, and I brought with me a picture book of trees and birds, and a dictionary that I thought I would love to use.

At one point, we both sat silently reading for hours.

On other days, we read together, we read poetry.

I started by reading haiku, hundreds of haiku, simple but great.

I used to ask him, "Tell me your favorite haiku."

There was also something really interesting

Issa Kobayashi's work "Don't take the soot that the spider in the corner is worried about"

“Until now, I took a nap without sin.”

And it is a beautiful work that depicts the first snow of the year.

Somewhat mysterious and beautiful, just like poetry

The aftertaste is as important as the words themselves.

I also read a poem by W.S. Merwin, in which he wrote of his wife working in the garden, and I realized that I was going to spend the rest of my life with her.

"If we could go back to any time, then it's spring. We'll never get old. In the slow morning, the old sorrows will clear like pale clouds." I asked Patrick what was his favorite line, "We'll never grow old."

He says he remembers a place where time has stopped, a place where time seems lost.

I asked if there was a place like this where eternity flows

"My mother," he replied

When you read poetry with someone else, the meaning of the poem changes.

Because it becomes personal to the person and to you.

After that, I read a ton of books. I read the autobiography of Frederick Douglass, who was a slave in the United States, but he taught himself to read and write, and literacy gave him freedom.

I grew up thinking of Frederick Douglass as a hero, so I thought this story would be encouraging and hopeful.

But this book freaked Patrick out.

He stuck with a story Douglas had written about a master giving a slave a gin at Christmas to show the slave that his freedom was too much for him.

Because slaves get drunk in the fields

Patrick said he understands

He said that some people in prison don't want to think about their situation like slaves because it's too painful.

Because it's hard to remember the past and think about the long road ahead.

His favorite line was, "Whatever you do, stop thinking about it!

If you keep thinking about the situation, the suffering will continue forever."

Patrick said that Douglas was brave because he kept writing and thinking.

But to me, Patrick seemed to overlap with Douglas.

he panicked, but he continued reading

He finished the book before I did, on a concrete staircase with no lights.

And then I went on to one of my favorites, Marilyn Robinson's "Gilead," which is a long letter from a father to his son.

He loved this line, "Listen to me, if I ever wonder what I've accomplished.

You were always a gift from God, a miracle, more than a miracle."

Something about those words--the love, the longing, the voice--made Patrick want to write.

He filled notebooks with letters to his daughter.

In these beautifully detailed letters, I imagined my daughter and I canoeing down the Mississippi River.

I imagined a mountain stream with crystal clear water.

As I watched Patrick write, I thought to myself, and I would like to ask you a question: Has anyone ever written a letter to someone who disappointed them?

It's much easier to forget that person

Patrick faced his daughter day after day, feeling a responsibility to her, focusing on every word.

I wish I could face danger like this in my life.

That's because you can see the strength of your heart through that danger.

I would like to come back here and ask a difficult question to answer.

Telling this Patrick's story What do I deserve?

Patrick was the one who confronted this suffering, and I never had a day like that.

I've thought about this question many times, but I want to say that it's not just Patrick's story.

This is our story, about the inequalities between us.

This rich world is a world where Patrick and his parents and his grandparents have been shut out.

In this story, I embody a world of abundance.

When I tell this story, I think about myself and my powers.

I didn't want to hide

By telling this story, I want to expose that power and ask: how do you make this distance disappear?

I think reading is one way to close this distance.

Give us a quiet world to share and share equally.

I'm sure you're wondering what happened to Patrick.

Did reading save his life?

You can say yes or no

It's been an unbearable journey since Patrick's release.

Because of his criminal record, he had no one to hire him, and his mother, who was a good supporter of him, died of heart disease and diabetes at the age of 43.

he had no home and was starving

So some people were exaggerating about reading.

Even when he learned to read, the discrimination against him didn't go away.

could not prevent the death of his mother

So what does reading bring?

I would like to conclude with some answers.

Reading enriched him inside, whose mystery, imagination, beauty changed him inside.

Reading brought me images and joy: mountains, seas, deer, frost, etc.

It is a word that feels freedom and the natural world.

Reading made up for what he had lost

How irreplaceable was Derek Walcott's passage

Patrick recited this poem

"The days I held, the days I lost, the days grow like daughters, my arms wander"

Reading taught him courage

He kept reading Frederick Douglass no matter how hard it was.

he tried to be conscious no matter how painful it was

Reading is thinking. Reading is difficult because you have to think.

Patrick didn't stop thinking, he chose to keep thinking.

And reading gave him the words to speak to his daughter.

he wanted to write by reading

Reading and writing are strongly linked

When we start reading, we find the words

he found the words to connect the two

I found the words to say how much I love my daughter.

Reading changed our relationship, too.

It gave us an opportunity to reach out to each other beyond our different perspectives.

And reading has removed unequal relationships and given us fleeting equality.

Meeting someone as a reader is a completely new and fresh encounter.

I don't know which passage he likes

I don't know what kind of memories and grief you have

Face his ultimate inner self

And then you start thinking, "What is my inside?"

Do you have something to share with someone?

In closing, I'd like you to read my favorite passage from Patrick's letter to his daughter.

"Even if there are dark places in the river, the sunlight filtering through the trees shines.

The branches are rich with mulberries

Reach out and grab it.”

The letter also says, "Close your eyes and listen to the words.

I'm thinking of this poem, and I want you to do the same."

thank you

(applause)

This is whole wheat bread. This is a bread made with a new technology that I'm working on. It's something I'm developing and advocating.

It doesn't sound like a very appetizing name, but... the reason for the epoxy manufacturing method is yes. What is epoxy?

It's two separate resins that can't be used as glue, and when you mix the two resins together, it magically sticks together to form a very strong glue.

Now, with this technology, my goal was to bring together 20 years of the breadmaking world to learn how to bake bread.

Everyone Makes an Effort to Eat Whole Wheat Bread

After 40 years of discovering that whole grain bread is good for you, we're finally getting to the point where we're actually eating whole grain bread.

(Laughter) The challenge for the artisan who makes whole grain bread is how to make good bread.

It's easy to make delicious bread with refined flour.

The main component of refined flour is starch, and starch is sugar.

A good baker knows how to draw out the sugars in starch.

For whole grains, there are some obstacles.

Wheat crust is the most nutritious part of bread, and it's also high in fiber, because the crust itself is fibrous.

The germ is also good for you, but the skin and the germ aren't the tastiest parts.

Whole grain bread has always been good for you, but there is a history of not many people eating it. We want to eat healthy food that tastes good.

Every baker Every culinary school student Every chef's goal is to deliver deliciousness

Taste is important Taste decides everything

I call it the law of good taste

And it's easy to get someone to eat something healthy once, but if it doesn't taste good, they won't eat it again, right?

This is the difficulty of making this bread

I want to eat this bread later, but before I do, let me tell you a little more. It's not just made from two doughs.

it's just moist bread dough

It's a dough called a "soaker" that combines with water, which helps the enzymes get to work.

In bread dough, enzymes are the secret to deliciousness.

Enzymes release sugars in starch

that's how enzymes work

If you can pull the sugar out, you can taste it.

Sugar becomes food for yeast

The sugar caramelizes when baked in the oven, creating a beautiful crust.

Let the other bread dough ferment

It can be a sourdough dough or something called "biga" or some other dough with a little yeast, which also develops flavor over time.

And the next day, put the two dough pieces together.

This is the epoxy process, and we're hoping that the dough with the enzymes will become the fuel for the dough, which is responsible for the leavening, and we're going to combine these two doughs, add some ingredients, and hopefully bring out the natural flavors of the grains.

Here's the challenge Let's take a look at the 12 stages of the grain-to-bread journey

After a quick introduction to the 12 stages, I'll explain it again.

It's the first stage

This is the first thing every student does

Everyone in the culinary world knows that the first stage is "mise en place," which is simply French for "to prepare."

Everything you need is ready This is Stage 1

In the world of baking, it means having the right amount of ingredients.

Stage 2 is "Mixing" Mixing the ingredients

let the gluten out

There is no gluten in wheat flour, only the potential for gluten.

You can also see the sprouts of epoxy here. When you mix them together, you get glutenin and gliadin, neither of which is strong enough to make good bread.

When combined with water, they bond together to form a strong molecule called gluten, a strong protein.

In the "mixing" process, you have to create gluten, yeast, or yeast activation, to ensure that all the ingredients are evenly mixed.

Stage 3 is "Fermentation" Deliciousness is born at this stage

The yeast activates and begins to break down the sugars, producing carbon dioxide and alcohol, sort of like belching and sweat, which is the basis of bread.

It's yeast belching and sweat

And strangely enough, it transforms. The burps and sweats of the yeast transform, leading to the core of what makes bread such a special food. Bread is a food that transforms.

Now let's look at the next few stages

As the fermentation progresses, the taste and individuality of the food will emerge.

Arrange the shape of the separated clump.It is usually round, but sometimes it is cigar-shaped.

it is called "rounding"

And there is a short period of resting the dough

Let it rest for a few seconds to 20-30 minutes

Next, we proceed to the final mold making.

It's a few seconds of work, but it's a distinctive stage.

Can be put in a loaf mold

and stage 9

Fermentation, which started in stage 3, continues, and as the stages progress, the taste deepens.

Final fermentation occurs at stage 9

It's called "final fermentation".

This is the stage to confirm that the bread dough is alive

And in stage 9, the bread dough is in its final shape.In stage 10, it goes into the oven.

Three transformations occur in the oven

The sugar in the dough caramelizes and becomes the crust of the bread.

This gives the bread a nice brown crust

Only the surface of the bread is hot enough to caramelize.

the protein or gluten inside coagulates

At 160 degrees, the proteins line up to form a structure, the structure of the gluten, which is what we call the soft part of the bread.

Starch gelatinizes at 180 degrees

This gelatinization is another transformation that occurs in the oven.

Coagulation, Caramelization, Gelatinization Starch is sticky and expands and bursts as it absorbs moisture from its surroundings.

When it bursts, it scatters starch into the bread.

We're eating yeast sweat and belching and bursting contents of starch.

Transformation occurs in the oven in stage 10. The dough put in the oven comes out as bread in stage 11.

Stage 11 is the “cooling down” stage. Baked bread is not often eaten right away.

The effect of baking will continue for a while even after baking.

the protein is prepared

Stage 12 is called "packaging" in textbooks, but my students call it "eating."

Today I would like to experience the journey from wheat to bread. Later, I would like to taste this bread.Is it successful in bringing out the deliciousness, which is the mission of a baker?

But before I do that, I'd like to review the 12 stages and look at them from the perspective of transformation, because I believe that all things can be understood on four levels, and that's what we've been saying since the time of Socrates.

and finally mysteriously

It's hard to understand the next level without verbatim understanding.

Dante said that understanding the first three levels is difficult without understanding the first level, which is why we talk about bread verbatim.

I'd like to look at a series of stages from a deeper level, a quest to answer the question, "Why is bread so special?"

And from the perspective of the mission to bring out the maximum deliciousness

What's happening is that bread making starts with wheat and other grains.

What is wheat? it is a kind of grass that grows in the earth

and produce seeds like any other grass

We harvest the seed and this is the grain of wheat.

what is the harvest

it's a euphemism for taking life

That's the harvest. We harvest the pigs, you say.

we will have food with life

Harvest the wheat and harvest the life of the plant

Living wheat gives up its seeds by harvesting

If it remains as a seed, it may become the next plant.

seeds can be planted

part of the seed is used for the next generation

But most seeds are ground into flour.

At this point wheat undergoes the ultimate transformation.

Not only has it been cut, it has lost its potential to regenerate as a plant in the future.

we make it into flour

Again, I believe that bread is a transformative food.

First Transformation -- By the way, my definition of "transformation" is a dramatic change from one thing to another.

dramatic change not subtle change

Subtle changes, not hot water turning to hot water or water turning hot water, but water heating to steam.

That's transformation. Before and after transformation are different things.

For bread, the first transformation is from life to death.

I think it's a dramatic change.

and you can make flour

and add some water

weighed in stage 1

In stage two, we add water and salt and mix them to create what we call "clay."

it's actually like viscosity

Add a "expansion agent" to the clay.

In this case we add yeast. What is the meaning of leavening agent?

The word leaven comes from the word to revive.

Do you know the Hebrew word for "clay"? Adam

In this moment, the baker becomes, in a sense, the god of the dough, which in its simplest form comes to life.

You know it's alive when the dough grows in stage three.

And while it grows, many transformations literally take place.

enzyme makes sugar

Yeast breaks down sugars to produce carbon dioxide and alcohol.

Bacteria also break down sugars and produce acids.

In other words, the personality and character of the bread is shaped under the watchful eye of the baker.

And the choices the baker makes during this process determine the outcome of the bread.

Small changes in temperature Small changes in time It's all about the balance of temperature, time and ingredients These are the arts of making bread.

All these things are decided by the baker, and the bread goes through several stages to develop its characteristics.

The large pieces of dough are then divided into smaller pieces, which are shaped by the baker.

As soon as it is given shape, it is fermented again, proving that the dough is still alive and developing the characteristic flavor of the bread.

Put in the oven at stage 10

At this point, it's still dough, and very few people eat it straight.

I've met some people who eat dough, but they don't usually eat dough, but what we eat is bread.

But the dough is what you need to make bread, and when you put the dough in the oven and the temperature inside the dough exceeds 140 degrees, it exceeds what we call the death temperature (TDP).

My students love TDP, they think it's the name of a video game.

It's a "death temperature" where all life is lost.

With a mission to give life to bread and make it lively, the yeast completes its mission: that which used to turn the dough into bread ends its life.

Don't you think you can see the symbolism behind it?

To me, it seems to me that there's a reason why dough in the oven comes out of the oven as bread, or why something that was alive comes out lifeless.

This is the third transformation. The first transformation is from life to death.

Return to life with the second transformation

The third transmutation from life to death again, but the result is bread made from dough.

Another way to put it is from a caterpillar to a butterfly.

That's what comes out of the oven, what we call the food of life.

This is the finished product, this is what you eat and you can't imagine living without it.

Bread is used as a symbol of life because it is so tied to our psyche.

It is used as a symbol of transformation

And in stage 12, we eat bread. This closes the circle of life. We eat bread so that we can grow and survive.

Here's what I learned from bread

This is what pan taught me on my journey

And what I'm trying to do with this bread is, in addition to what I've been talking about, is using beer lees. It's beer lees bread, because making bread is very similar to making beer.

Beer is basically liquid bread, or bread is solid beer.

And (Laughter) it was invented around the same time, probably a little bit ahead of beer.

The Egyptian who was taking care of the beer fell asleep and bread was made under the hot Egyptian sun.

With this bread, what I've tried to do is try to get more out of the grain, and I've added the beer lees that are used to make beer.

Used in a variety of beers A variety of beer lees can be used

I prefer dark beer grounds. Today I used light beer grounds. It's either lager or light lager or ale, which is toasted wheat and barley.

So the brewers know how to get the flavor out of the grain, by sprouting, malting, roasting.

Pick a portion of this and apply it to the bread

This bread isn't just high fiber, it's fiber on fiber.

I hope that this bread is not just a healthy bread, but a delicious one.

Shall we divide this bread and give it a little taste?

I'll take some from here, and I'll give you the rest from here.

I'd like to end with what I call the baker's prayer.

So that the skin will be crispy So that the dough will rise properly

thank you

I have a friend who is a poet named Kava Akbar.

He found an autopsy photo of a blue whale's heart on the Internet, which a scientist had hung from a hook on the ceiling, thus showing that the blue whale's heart was large enough for an adult to stand inside.

Kava shared the photo online with the comment, "This is a reminder that the universe has already written the poem you are about to write."

I was stunned when I first saw it

"I'm not kidding! I'm creating a new analogy!

Trying to find beauty yet to be discovered!

What do you mean the universe is always ahead of you? ”

I know this isn't a poet's problem, but when the world seems extraordinarily big, extraordinarily improbable, extraordinarily deep, I feel like, "What can I contribute?"

A while ago, I caught my eye on a video that you may have seen.

It goes on the internet about every two months

Birds known as Starlings dancing in flocks—flying in large flocks

Someone just happened to be filming that flock of flying starlings on their phone.

At first it was just a shapeless mass, but at some point the birds scurried and formed shapes in the sky, like a starling in flight!

(Laughter) The moment I saw it, I was like, "The universe has already written the poem you're about to write!"

(Laughter) But this time, despair didn't overwhelm me.

I thought, yeah, maybe it's not my job to create something new.

Maybe it's my job to listen to what the universe has to offer and open my heart to what the universe has to offer So that when it's my turn to hold something up to the light, just for a moment, while it's with me-

The universe has already written the poem you're about to write

So you can't do anything, just point your fingers As the bodies of the starlings soar and descend Follow their innate choreography Flocks fly through the air Become a fluttering curtain In one intense moment Create an unmistakable shape A gigantic bird flapping its wings into the sky

That's why you're pouting, it's not out of surprise, and the next words you say are, "Oh, that's not natural."

Isn't it obvious that a blue whale's heart is as big as a house and has a room big enough for an adult to stand in?

No wonder figs are made because female bees lay their eggs in the flowers, die and decompose, and the fruit is evidence of her transformation.

Sometimes poetry is too bright for your stupid words

Sometimes poetry is so true no one believes it

i am a bird made of birds

This white heart is a house that people can enter

I'm dying here in this flower

it doesn't matter

that's why i'm here

I want you to receive this fruit

what it can give me

It may not be the first or the best, but it's the only way I can say I lived here.

(applause)

I'm going to talk about a fundamental change in the structure of the modern economy.

To do that, I'd like to go back to the basics, because the economy started with commodities.

Commodities are things that you grow or extract from the soil, basically animals, minerals, vegetables.

Get it out of the ground and sell it on the open market

Commodities are the foundation of the agricultural economy, and it's been that way for 1,000 years.

But then came the industrial revolution, and "commodities" became the main offering of the economy, where commodities are used as the raw material of production to make commodities.

We moved from an agricultural economy to an industrial economy.

And what's happened in the last 50 or 60 years is the commoditization of commodities.

Goods are treated as commodities, we don't care who made them

I only care about three things: price, price, price.

There is a way to combat commoditization, and that is customization.

My first book was "Mass Customization," which was mentioned a few times yesterday, and I discovered this evolution of economic value because I realized that customizing a product is turning it into a service, because it's done to a specific person, it's not stocked, it's delivered to a specific individual on demand.

So we moved from an industrial economy to a service economy.

But what's happened in the last 10, 20 years is that services themselves have also become commoditized.

Long distance calls sell for price and price and price, fast food restaurants are all price oriented, even the Internet is commoditized as a service as well as a product.

What that means is that it's time to move to a new level of economic value.

Going beyond the scope of products and services And, thinking along the same lines, what happens when we customize services?

What happens when the right service for a particular person becomes available exactly when they want it?

The person can't help but say, "Wow!" It turns into an unforgettable event. It has to turn into an experience.

So we're moving into an experience economy, a world where the experience is the economic offering.

Most of the places I speak, when I talk about experiences, I talk about Disney, the world's greatest experiential stage producer.

I also talk about themed restaurants, experimental stores, boutique hotels, and Las Vegas, the world's most experiential city.

But when you think of the experience, think of Thomas Dolby and his group playing.

think of meaningful places

Think about when you drink wine, think about a trip to the "Long Now Clock"

These are all experiences, including TED itself.

It's the 'experience capital' of the conference world

these are all experiences

Now, over the last few years, I've been spending a lot of time in Europe, especially in the Netherlands, and whenever I talk about the experience economy there, I get one final question, almost always.

Although it's a question, it's actually more of an accusation.

The Dutch always start with two words when referring to it.

Do you know what it is?

"You Americans are"

They say, "You Americans

Do you like that illusory world of yours, the fake Disney experience?"

They say, "We Dutch like real, natural, authentic experiences."

It happens so often that I've come up with a fairly familiar response, which is: First of all, let me point out that you have to understand that there is no such thing as an "unauthentic" experience in the first place.

why? Because experience happens within us

It's my reaction to what's played out in front of us

In other words, all experiences are real as long as we are in some way real human beings.

So, while there may be some unnatural or artificial stimuli in the experience, it is still only a matter of degree, not kind.

And there is no such thing as a 100% natural experience.

Even if you're walking through an ancient forest, there are companies that have made cars that have driven you to the edge of the forest: there are companies that have made shoes that protect your feet when you walk through the woods.

Some cell phone companies have them ready in case you get lost in the woods.

Recognize? They're all man-made, you brought them into the forest, and that's why they're there.

And I always end up saying, and this is the funniest part of the story, especially when it comes to questions from Dutch people, which is that Holland itself is like Disneyland, an artifact.

(Laughter) And the Dutch, as usual,

i realize i'm right

There is not an acre of land there other than reclaimed from the sea, or else only land that has been moved or tended to look like it was there all along.

It's the only place in the forest where all the trees are neatly aligned

(Laughter) But despite this, everyone, not just the Dutch, has this desire for authenticity.

So "authentic" is becoming the new consumer sensibility, the standard by which they buy what and from whom.

to become the foundation of the economy

In fact, if you look at how each economy grew, you'll find that each business had a need to match consumer sensibilities.

In the days of the agricultural economy, it supplied commodities

it's about supply and availability

was marketing commodities

Now that we're in the industrial economy, it's all about controlling costs, and keeping costs as low as possible so that we can offer a product to the masses.

The service economy was all about improving quality.

It's -- service improvement started with the rise of the service economy in the last 20 or 30 years.

And now, with the experience economy, it's important to play the real thing.

Acting the real thing - the key word is "acting"

right? "Acting," because you're letting your customers -- and your business partners do the same -- know that what you're proposing is real.

Because there is a fundamental contradiction: there can be no such thing as an inauthentic experience, but no business can offer an authentic experience.

Because all business is man-made; money is involved, all business is machine-driven, and opportunity creates imitations.

Now the question is how to make it look real

Are you acting authentic?

When you think about it, let's go back to Lionel Trilling's 1960 classic book on authenticity, "Sincerity and Authenticity," where he talks about the key points that make authenticity recognized as a classic.

Of course, in Shakespeare's plays, it's "Hamlet."

In the play "Hamlet" there is this passage, where Polonius, the most deceitful character in the play, speaks a very deep truth.

At the end of his long list of advice, he says to his son Laertes: Finally, and most importantly, be true to yourself.

If you do so, you will be loyal to others, just as you will succeed in the day and night (translated by Shoyo Tsubouchi)

These three lines of poetry are the essence of "genuine"

"Authentic" has two sides: one, being true to yourself, being very self-oriented.

The other is other-oriented: being what you tell others to be

And I don't know about you, but whenever I see two sides, I think, "Oh, 2x2!"

right? Anyone else? not present?

Hmm, if you think so, let's do it. Here's a 2x2 diagram.

One axis is that you are true to yourself

Business-wise, what are you providing financially – is it real? about it

The other axis is: Is it telling others, "This is it?" ,is

The negative form is "it's not real by itself" and "it's not what you tell others to be".

And of course, if any of these things are true to yourself and true to others, then you are real real!

(laughs) The opposite is of course fake fake.

ok by the way fakes have value too

There are always companies that supply fakes, because people want them.

There's actually a rule of thumb: "If you don't like it, it's fake. If you like it, it's fake."

(Laughter) So the other combination is real fake is what it says but it's not real fake real is real but it's not what it says

You can think about these two Better than fake fake but not as real real

To compare the two, imagine Universal CityWalk and Disney World, Disneyland.

Universal CityWalk is a "real fake." The term actually comes from Ada Louise Huxtable's book, "Unreal America."

It's a great book, in which she writes about Universal CityWalk that it's fake, but it's real fake, because you can see behind the scenes. right?

That's what it says: Universal Studios; it's in Los Angeles;

right? You don't get to walk a lot in Los Angeles, but there are so many places to walk here, in the open air, in the city.

But is it really real for this city?

Is it really in the city?

It's all you can see behind the scenes, all that's going on inside.

So she read it as a real fake

Disneyland, on the other hand, is fake real. It's fake reality.

right? It's not what it says it's not a "magic kingdom"

(Laughter) But that's -- oh sorry, I didn't mean that -- (Laughter) -- I'm sorry.

I'm not talking about Santa Claus

(Laughter) But Disney World is wonderfully real in its own right.

right? just wonderful and real in its own right

If you go there, you will be immersed in a wonderful environment.

So it's an unreal truth

Now, the easiest way to fall into this state and not be real real, the easiest way to not be yourself is to not understand where you come from, to reject tradition.

The key to being yourself is knowing who you are in business

To know one's tradition: to know what one has done in the past

And the course of the past determines what you can do in the future, and what you can do without in the future.

so i have to know your past

Think Disney Again

Disney Ten or fifteen years ago, Disney, perhaps known for its high family values, acquired the ABC network.

The ABC network, affectionately known in the industry as the T&amp;A network, OK? Isn't it an industry term that you don't understand?

Okay, T&A Networks, it bought Miramax, the company was known for NC-17 curfew, and suddenly families everywhere couldn't believe what that company was getting from Disney.

No longer honest with his traditions No longer honest with Walt Disney

That's why they've had so much trouble in recent years, and why Roy Disney is trying to get Michael Eisner.

'Cause I'm no longer honest with myself

Now you know that your past determines your future.

The easy way for companies to make mistakes about whether they're what they say they are, is to advertise what they aren't.

You recognize a company as a liar when it advertises something it isn't.

Think of every hotel, every airline, every hospital, etc.

Take a closer look at the ad and you'll have a great experience

(Laughter) But unfortunately, it's only when you experience the actual hotel, the airline, the hospital that you realize, "This is different."

Only then do you realize that this is a lie

So the first thing you have to do to be what you are told is to provide a place where you can experience what you are.

Who you are is what people experience

not through advertising

That's why companies like Starbucks exist, right? they don't advertise anything

They say, "If you want to know, come here and experience it."

And think about the economic value they created through their experiences.

right? What is the essence of coffee?

coffee beans

Do you know how much coffee is when treated as a commodity bean?

Two to three cents per cup, that's what coffee is worth.

But you can grind it up, package it up, put it on the supermarket shelf, and if you treat it well, it's going to be 10 to 15 cents.

Use the same product to make coffee for customers At corner restaurants, bars, kiosks, etc., a cup costs 50 cents or $1

But when you surround that coffee brewing place with a Starbucks feel, with cedar wood interiors, you can value two, three, four, five dollars just for that authentic experience, for a cup of coffee.

"Genuine" has become the customer's sensibility

Let me summarize for the business people in the audience with three basic rules.

One, don't call yourself real unless you're real.

Two: It's easier to be real if you don't say you're real

And three, if you say you're real, you better be real

And to the other consumers in the audience, to sum it up in one word, from now on you will be happier spending your time and money on something that satisfies your "realistic" desires.

thank you

I want to talk to you about the most amazing machines in the world and what they can do today.

Proteins, which are found in cells right here, are basically responsible for all of the body's vital functions.

Protein digests food, makes muscles contract, fires nerve cells, and supports the immune system.

Almost everything that happens in living things happens thanks to proteins.

Proteins are chains of building blocks called amino acids.

Nature uses an alphabet of 20 amino acids, some of which you may have heard of by name.

This is a picture of a protein, and each particle is an atom.

This long, stringy molecule folds into a unique three-dimensional structure due to chemical forces acting between amino acids.

This folding process seems random, but it's actually quite precise.

Each protein folds into its own unique shape each time, and the folding process takes only a fraction of a second.

The shape of this protein allows it to perform its wonderful biological functions.

For example, hemoglobin is in the right shape to bind oxygen molecules when it's in the lungs.

When the hemoglobin moves to the muscles, it changes shape slightly and releases oxygen.

The shape of a protein, and therefore its marvelous function, is completely determined by the sequence of amino acids in the protein chain.

Each letter at the top of this picture is an amino acid.

where does this array come from?

Genes in the genome determine the amino acid sequence of proteins

One gene encodes the amino acid sequence of one protein.

Translating these amino acid sequences into protein structure and function is known as the "protein folding problem."

This is a very difficult problem, because one protein can take many different forms.

The problem is so complex that humans have only been able to harness the power of proteins by making small modifications to the amino acid sequences of proteins found in nature.

This is similar to how our Stone Age ancestors made tools and other objects out of sticks and stones found in nature.

But humans aren't able to fly because they modified birds.

(Laughter) Scientists took inspiration from birds to understand the laws of aerodynamics.

Egenia used those laws to design his own flying machines.

In a similar vein, we've been working for years to figure out the basic laws of protein folding and try to put those laws into a computer program called Rosetta.

And there's been a lot of progress in recent years.

We can now design new proteins from scratch on the computer.

After designing a new protein, you encode its amino acid sequence into a synthetic gene.

We have to create a synthetic gene because it's a completely new protein, and the gene that encodes it doesn't exist in any organism on Earth.

As our understanding of the protein folding problem increased, protein design became possible, and at the same time the cost of gene synthesis fell and, according to Moore's law, the power of computers increased, tens of thousands of new proteins with new shapes and functions could be designed on the computer and encoded into synthetic genes.

Once you have a synthetic gene, you inject it into a bacterium, and you program the bacterium to make that new protein.

Once you've extracted the resulting protein, you can see if it's doing what it's designed to do and if it's safe.

It's exciting to be able to make new proteins, because nature is full of diversity, but the proteins that evolved through evolution represent only a tiny fraction of the proteins that can be made.

I said earlier that nature uses an alphabet of 20 amino acids, and a typical protein has about 100 amino acids in a chain, so the number of possible proteins is 20 multiplied by 100, which is about 10 to the power of 130, which is far greater than the number of proteins that have existed on Earth since life began.

And this unimaginably large area can now be explored with computational protein design techniques.

The proteins that exist on Earth were born to solve the problems we faced in the process of evolution.

Genome duplication is one example.

we are facing new problems today

Longer lifespans have necessitated a new disease response.

It's polluting and warming the environment, and we have a lot of ecological problems.

If we can wait a million years, we might evolve a new protein that solves our problem.

But we can't wait millions of years

Instead, computational protein design allows us to design new proteins to tackle today's problems.

Our ambitious idea is to take biology out of the Stone Age through the technological revolution of protein design.

We have already shown that we can design proteins with new shapes and functions.

Vaccines, for example, stimulate the immune system to produce a strong response to pathogens.

To make a better vaccine, we designed a protein particle that binds to a pathogenic protein, shown here in blue, from the respiratory syncytial virus.

By creating a vaccine candidate with spikes of viral proteins like this, we found that it elicited a much stronger immune response than any vaccine that had been tested to date.

This is an important finding because RSV is one of the world's leading causes of infant mortality.

We're also designing new proteins that break down gluten in the stomach for celiac disease and proteins that stimulate the immune system to fight cancer.

These technological advances are just the beginning of the protein design revolution.

We were inspired by the technological revolution that happened before, the digital revolution, where a big chunk of technological progress happened in one place: Bell Labs.

Bell Labs has been able to attract the best and brightest minds from around the world in an open, collaborative environment.

And that led to a series of wonderful inventions, including transistors, lasers, satellite communications, and the foundation of the Internet.

What we're aiming for is "Bell Labs protein design."

We want to bring together talented scientists from around the world to accelerate the protein design revolution. We have five big challenges.

First, by extracting proteins from influenza strains around the world and combining them with the protein particles that we designed earlier, we're trying to develop a universal influenza vaccine that, with a single dose, will provide lifelong protection against influenza.

On the computer -- (Applause) The ability to design new proteins on the computer is important not only to protect against natural flu epidemics, but also to protect against the threat of intentional bioweapon terrorism.

The second is to go far beyond nature's limit of just 20 amino acids and use the alphabet of thousands of amino acids to create medicines for things like chronic pain.

Third, we're developing advanced vehicles to bring existing therapeutics to the parts of the body where they're needed.

For example, it delivers chemotherapeutic drugs to tumors, gene therapy drugs to tissues in need of gene repair.

Fourth, we're designing intelligent treatments that do the math inside the body, far more advanced than current medicine, which is a very imprecise tool.

For example, something that targets only a small fraction of the immune cells that cause an autoimmune disease, leaving the majority of healthy immune cells unaffected.

Fifth, we're taking inspiration from amazing biomaterials like silk and avalon shells and teeth to design new protein-based biomaterials to address energy and environmental issues.

We're expanding our labs to do these developments.

We're looking for energetic, talented, and diverse scientists, and we want people from all over the world, at all stages of their careers, to join us.

You can join the protein design revolution through the online design game Foldit.

You can participate in the distributed computing project "Rosetta@home" from your computer or Android phone.

Making the world a better place through protein design is my life's work.

I can't wait to see what we can do with you

We look forward to your participation. Thank you.

(applause and cheers)

my job is to play

i play when i design

Just to make sure, I checked it in the dictionary. It's really about playing. The definition of playing is 1. childish activity or - making an effort 2. gambling.

Yes, we do both during design.

I'm always childish and gambling

If you're a designer and you're not having fun, then you think there's something inherently wrong with the organization or situation you're in right now.

But I'm not good at being serious, so I couldn't understand it.At that time, I remembered an essay.

That's an essay I read 30 years ago.

The author was Russell Baker, author of the New York Times column "Observer."

He's got a great sense of humor. I'll read the summary of his essay.

Advise me as a friend

get serious

of course it means take it seriously

It's easy to be serious

It is difficult to do seriously

Children always enter from the heart, which is why children are more interesting than adults.

Adults are generally serious

Serious candidates in politics are rare, like Adlai Stevenson, who can easily lose to a serious candidate like Eisenhower.

The reason for this is that most people are more comfortable with the seriousness they often see rather than the seriousness they rarely see.

Affordable and healthy, jogging is serious

poker is serious

Washington D.C. is serious

new york is serious

Talking about the future at educational events is serious

Alone I go for a long walk Robbing Tiffany's I'm serious about thinking of the perfect crime

(Laughter) If you apply Russell Baker's definition of seriousness to design, you'll find that it has nothing to do with the quality of your work.

Serious design is always important and very effective.

Serious design tends to be socially correct and favored by the right audience.

That's what a lot of designers and clients are looking for to get the job done right.

Serious design Serious play is different

For one thing, seriousness comes naturally, intuitively, by chance, or incidentally.

It is the result of innocence or arrogance, selfishness and sometimes carelessness.

It's usually driven by inexplicable, crazy human nature.

Serious design is incomplete

It's full of imperfections - common in first builds

In all seriousness, serious design is often a failure.

Because the essence of real play is invention, change, and rebellion, and perfection comes second.

It's time to play hard when you want perfection

I thought a career in design was an unrealistic staircase.

If you look at that staircase, people in their 20s have a very high step and a short width.

Growing up when you're young

I don't know anything and I have a lot to learn, so whatever I do is a good experience.

As you get older, the steps become lower and much wider, and you move at a slower pace because you discover less.

I'm getting old again, I'm getting old, I'm crawling, so to speak, up the long, melancholy stairs, and disappearing into oblivion.

(Laughter) It's very difficult to be serious.

I'm usually expected to be serious in my work, but I feel like I'm being too serious than necessary.

In my experience in the last 35 years, I've only been really serious four times.

Let me show you them. Seriousness showed up under certain circumstances.

kids are nice

When I was in my 20s, I was designing album covers for CBS Records, and I didn't realize how cool it was.

I thought everyone would be like this

And the way I looked at design and the world -- the things around me -- the things I encountered in the design world at the time, were my enemies.

I really, really, really hated the Helvetica font.

The Helvetica font was too pretty, too boring, too fashionable, too oppressive, and I hated any design that used Helvetica.

When I was a student, this kind of design was trendy and popular.

Nice cover of Rudy Dehalak, but Helvetica couldn't stand it, so I made a parody version.

it was too boring

(Laughter) My life goal was to use something other than Helvetica.

But it was very difficult, because we had to find alternatives.

In the early '70s, there were very few books on the history of design, and design publishing was expensive.

If I had to find an antique shop, I would go to Europe and look for it.

I had to go to various places to find nothing.

And the answer I finally found was Art Nouveau, Art Deco, Victorian Typography... anything but Helvetica.

Self-taught, and when I was just starting out, I used these on record covers and in my own designs.

I was not taught, I built it from scratch.

I mixed Victorian with pop, mixed Art Nouveau with something.

And I made these gorgeous, ornate jackets. I'm not a postmodernist, I'm not a history buff, I didn't even know what they were.

I just hated Helvetica.

(Laughter) It's that passion that allowed me to play for real, something I can't do anymore now that I've had enough experience.

Being young like that is a wonderful thing, because you can grow up and play as you like, and you can do big things, even though you're a little kid.

By the late 70's this kind of thing was well-known -

'Cause it spread all over the world, it started getting awards, and everyone knew.

So I suddenly became a postmodernist and started my own business.

I was praised at first, but then I was criticized, and I got serious.

After that, I don't think I did any serious work for about 14 years.

For most of the '80s, I took it seriously. I kept making designs that people wanted, and I thought that was who I was.

So in the second situation, where we got back to serious play.

There's a movie I love, called "The Verdict," starring Paul Newman.

I don't know if you've seen it, but it's a very good movie.

In this movie he plays a corrupt lawyer.

He is introduced to a seemingly easy medical malpractice lawsuit, but as he prepares for trial, he sees the victims so pathetic that he develops empathy, restores his ethics and purpose, and wins the case.

A scene in the movie I can't seem to win Standing in the brink of despair I want to take this case I really want to win -

There's a scene where Paul Newman is alone in his office and says, "This lawsuit, this is the only one."

"This lawsuit, this is the only one." "This lawsuit, this is the only one."

It's this dedication and focus that wins the case.

This is the essence of serious play.

In 1994, the same thing happened to me, when a theater director named George Wolfe asked me to design the then New York Shakespeare Festival, a symbol of today's public theater.

And I'm immersed in this project like never before.

This is the theatrical advertisement of the time

Published in the New York Times, etc.

The ad at the time looked like this

The Public Theater had much better publicity than this.

It didn't have a logo or anything like that, but it had this iconographic poster, by Paul Davis.

George Wolfe had just become a director, and he was trying to change the theater.

So I took my passion for fonts and immersed myself in this project.

I became the voice of the place, the visual voice, like never before, I designed every facet of it -- the smallest ad, the ticket, the smallest thing.

there was no uniform format

We didn't have a dedicated department, so we couldn't even throw a round.

For three years, I made literally everything - anything in print, anything online - everything the theater did.

I had other jobs, but I just focused on this.

Since then, I've never been so engrossed in being with a client.

I was able to really express myself and grow.

You know when you're given that opportunity, and it's rare, but when you get that opportunity, it's real play.

I'm still doing this

I still do public theater work.

I am a member of the board of directors and participate in the business.

The high point of public theater, I think, was in 1996, two years after I designed it, the "Noise and Funk" campaign, and all New York was hyped up.

But something has changed, and it's become too famous.

Goodbye to serious people, I got serious

And what happened was that New York City ate my existence, and people started copying.

It's an ad in the New York Times, copied in an ad for a play called "Mind Games."

"Chicago" used a similar imagery, and the Public Theater lost its identity, so it had to change.

I made a different one for each season, and I made these posters, but it didn't have the seriousness that the original one had, because it was all disjointed and disjointed and didn't convey the weight.

After the Public Theatre, I worked for a dozen or so big cultural institutions, but I never regained the seriousness that I felt at that time.

Public facilities are serious, so is the design.

I was more sophisticated than I was at the Public Theatre, and I spent more money, but I never went back to that time.

The secret to designing for real -- we all have opportunities -- is that the job is just not the right one.

In a rare event, I had an experience in 2000. I don't know why, but many architects asked me to work with them on the interior design of a theater, and I was responsible for bringing environmental graphics into the interior of the building.

It was my first time doing this kind of work

I couldn't read architectural blueprints. I didn't even know what they were talking about. And I couldn't imagine a single job lasting four years.

So it was a very difficult task, but I gradually became more focused on the process of merging graphics and architecture, because I didn't know what I was doing.

I said, "Why can't the display be on the floor?"

New Yorkers watch their feet

We've also learned that actors look at the floor to receive their next cue, so these cues made sense.

We were able to integrate into the building in an interesting way.

They were in corners, they climbed the side walls, they blended into the architecture.

Symphony Space, on the corner of 90th Street and Broadway. The type is combined with stainless steel. It has fiber optic backlighting.

The architect Jim Porchk gave me a canvas to play with type.

it was a real game

It's a children's museum in Pittsburgh, Pennsylvania.

Pop-up type with neon

It's something I've never made before.

i thought it would be fun

Lucite donator list

and inexpensive display

(Laughter) My favorite is from Newark, New Jersey.

It's a performing arts school.

We didn't have the budget for this building.

I said let's use Photoshop to paint it.

And painted it's just play

This is the building, it's all painted, and there's print all over this hideous building, including the air-conditioning pipes.

We hired people to paint apartments by the garage, and we did the painting, and they were very happy.

I fell in love with it, I couldn't believe it, I became serious

They would climb up the building, call me, tell me to fix the typesetting, tell me that the spacing is wrong, and correct me, they did an amazing job.

They were very serious, too. It was a great experience.

By the time I did Bloomberg headquarters, I was starting to get recognition for my work.

I started getting asked to work in big, expensive places.

So I started to get serious

Bloomberg is a world of numbers, so we drew big numbers in space and projected them in spectacular LEDs, programed by our partner, Lisa Strassfeld.

But this was the end of the real game, I got serious again.

This is my current project in Pittsburgh, Pennsylvania.

I was asked to design a logo for a residential neighborhood called the North Side, and I thought that logo for a residential neighborhood was silly.

I even thought it was creepy. How could there be a logo for a residential area?

In a residential area, there's usually a landmark or place. There's a restaurant, but there's no logo.

So I ended up actually presenting it to the city council and the townspeople, and I went to Pittsburgh and I said, "Hey, here's just the viaduct that divides the city center from the city.

If so, why don't you decorate it and make it a landmark?"

So, I started with this outrageous presentation, saying, "How about a viaduct decorated like this? It's just a suggestion."

But I thought it was just too inappropriate for the project -- it was so ridiculous that I would completely ignore their request, and that's why -- the idea would be so well received -- it's so crazy in the first place.

And this is exactly what the viaduct looks like in the works right now.

It's going to be an installation that will change every six months, and it will probably become a landmark on the North Side of Pittsburgh.

John Hickenberry told me about my struggles with Citibank, and we're still working together after 10 years.

They're delightful customers, and they're a very, very, very, very big company, and they have a great sense of design.

At our first meeting, I drew the Citibank logo on a napkin.

It was the play part of this job.

And for the next year, I sat in long, boring, boring meetings that brought tears to my eyes, pitching the logo to this giant corporation.

I thought I was going crazy at the end of the year

We were doing stupid presentations, saying that this logo made sense, showing that the umbrella was the model, making animations, back and forth, back and forth, back and forth.

It was worth it, because they bought it, and it went viral, it got recognition all over the world, but it was a very, very depressing year for me.

Actually, the time when people really liked this logo was when Fallon launched a "rich life" campaign, and it finally got accepted around the world.

During this period, I couldn't stand the insane reality of attending long, stupid meetings without something to make up for.

So I decided to go to my villa and paint a picture, a very big, very complicated, boney, interlaced map of the world, where I would write every place on the planet, misspell it, put it in the wrong place, and have all the information in my hands.

It took six months at first, but it got faster.

United States of America

I drew all kinds of cities

It was on display at the Cooper Hewitt Museum for eight months, and people would come up to me and point me to a map and say, "I've been there before."

Of course it can't be, it's the wrong place.

(Laughter) But what I liked about it was that I was totally and completely playing around with controlling the trivial information and creating my own palette of information.

My favorite is Florida, which I drew after the 2000 presidential election, where the election results are rocking.

left as evidence

(Laughter) Someone came to my house, saw these paintings, and recommended them to a gallery.

Interestingly enough, these paintings sold.

It happened very quickly and it became popular.

we started replicating

It's Manhattan. It's part of a series.

It's America. I used red, white, and blue.

I also did a large silkscreen reproduction, which also sold.

So the gallery told me that the next exhibition would be in two years, so I really had to paint these paintings, much faster than I ever had before.

I noticed something strange

it was no longer play

I was working hard to meet the expectations of the exhibition.

As this painting became more successful -- because I'm not a beginner -- I knew how to make it -- I was no longer serious, I was serious.

It's scary -- what you start ends up getting there -- and all that's left for you is to go back to the beginning and find the next thing you can do -- something you can create, something you don't know yet -- something you can be confident in, something you can fail -- something you'll be stupid for.

Ultimately, this is how you grow, and in the end, that's what matters.

(Laughter) And I have to break down this staircase.

thank you

I wanted to use a slide projector this time, and I kept trying until the very end, but in the end I couldn't use the projector.

(Laughter) I think slides are very emotional. (Laughter) I like them because they're intimate.

In return, I can't deny that there are parts where we have to compromise, but for example, we can't let ugly characters jump in vertically, horizontally, or diagonally.

(Laughter) Just an idea.

Somehow it's nice that the slide gets caught

At times like that, I really wish I could have a burning sensation in my heart every now and then, but that won't happen tonight.

Without further ado, let me show you the first slide.

This is, of course, this is, of course, this is, of course, a can of freshly emptied beer taken in Portugal.

(Laughter) When I first arrived in Barcelona, ​​it struck me, after an overnight flight, I saw this and was like, what a lean design.

At such a major airport, only "B" for Barcelona

How wonderful

In recent years, everything has become simpler, but at such a large airport, no way! I took it thinking that

I've never seen such a cool thing at an airport

But a few months later, I had the opportunity to go to the same airport again, on the same flight, and when I looked up like I did before, this time I saw a "C"

(Laughter) That's when I finally realized it was the gate number.

(Laughter) I believe that design involves emotion. Design has a message already being sent before you read the text and know the rest of the information. A product, a story, a painting, whatever it is.

This is the area that interests me the most, and I think this slide is the simplest example of how to explain this.

Two identical garages next to each other

First, you know what I mean

would be clear

Now let's look at the second one and see if there's a difference.

Which one would you like to park in front of?

(laughs) Same color, same content, same words

The only difference is the garage owner's expression of "No Parking" So which one is the killer?

(Laughter) You don't have to say it.

I would park in front of the first garage

As you've probably noticed, graphic design has gotten a lot simpler in the last five years.

Perhaps because it has become too simple, some things have already gone the opposite direction.

I saw this sign when I was in Milan, and I was so happy to see that minimalism could be applied to graffiti art.

(Laughter) Because this artist messed with the sign a bit and walked away.

(Laughter) I didn't overdo it, as I often do.

(Laughter) For the book by Metropolis.

I took some pictures, and this is a billboard in Florida. Either the advertiser didn't pay, or they decided not to pay anymore, or the sign maker skimped on the cost of removing all the ads, and the ads were patched together.

I think this is more effective than the original in terms of getting attention.

Although the product itself is a terrible product

It's from my second book

The first one was called "The End of Printing," and I also made a short film of the same name with William Burroughs.

It's called "The End of Printing," and the fifth edition is in print.

(Laughter) When I first contacted Mr. Burroughs, he said, "Printing never ends."

I was fine with that, so I asked him for advice.

At the end of the film, he has a wonderful voice, which I can't quite replicate, and he says, "I've been to an art exhibition called Photography: The End of Painting."

Some thought painting was over when photography was established.

From now on, everyone will take pictures

it was wrong of course

This is a book about intuition called "Second Sight."

I believe that intuition is the most important component of design.

everyone has

It's not something you can teach, either. It's easy to underestimate intuition in schools because you can't actually quantify the element of "intuition."

so it tends to be neglected

In the words of Einstein, "Discovery requires little intellect.

A momentary leap of consciousness – call it intuition, but the answer just comes.”

For example, whose song was it? and

It's like the more you think about it, the less you know, and the moment you stop thinking about it, your intuition flashes and you know the answer.

I like this for several reasons

In design education, we are taught that this cannot be read.

If you look closely, it's not only readable, it's exactly that.

"Don't mistake legibility for communication."

(Translation: "Don't confuse readability with communication") Easy to read doesn't mean easy to understand

Whether it works or not is another matter

So before we actually understand the content, what is the message we receive?

I think this is an area that is often overlooked.

A book about Marshall McLuhan

Together with his wife and son, Eric, we found about 600 McLuhan quotes, all of them ahead of their time, and actually predicting what happened in advertising, television and media.

That's why I named the book "Maxims"

Most of them are unpublished and I tried to interpret them in my own way.

This was originally the table of contents

It started out as 540 pages, but then the publisher cut a lot of pages, and now it's about 400 pages.

But I liked this table of contents page, so I kept it.

(Laughter) This has absolutely nothing to do with the actual content, but it's a nice spread.

(Laughter) I'm going to show you a couple of spreads from the book. Mr. McLuhan says, "New media is not a bridge between humans and nature, it's a part of nature."

"The invention of printing abolished anonymity and fostered the habit of literary fame and treating intellectual labor as private property."

“When a new technology appears in a society that is accustomed to the old, various anxieties come to the fore.”

"Humans try to create a world that is very different from the one we have today, but in the end they only form a vivid picture of the past."

This is hard to read and the worst

(Laughter) (Applause) "A human being in the electronic age has no environment other than the Earth and no job other than information gathering."

Here are his words: not so far out

This is the work I did for Nine Inch Nails

All of a sudden, I saw a connection, so I decided to show you the work I did right after 9/11.

I recently found out that the house I bought in LA had a bomb shelter, but the real estate agent didn't say anything.

(Laughter) I heard that there was one that was built in the '60s, during the Cuban Missile Crisis.

When I asked the real estate agent what this was, he said, "It's something related to sewage," so I didn't care.

I didn't pay attention to him because he said, "It's something related to the sewage system."

When I finally went inside, it was a rusty circle with two beds, and it was very eerie.

Surprisingly, the bunker is made of cheap metal and is completely rusted, flooded, and full of spiders.

what were you thinking

I should have used cement or something

Anyway, I used that bunker for the cover of the Nine Inch Nails DVD.

This is an experiment I did with Quicksilver, where I put six photos in a row and tried to direct people to the Internet when they saw the print.

Here are 6 consecutive photos

I cropped one photo in different ways

I also added a short sentence, "If you want to see all this surfing, go to the website."

Seeing this, many surfers must have visited the site

I'm not sure, so I could be wrong

(Laughter) I don't have a website, just this print.

This is a poster commissioned by New York's anti-smoking advocacy group.

I've been all over NYC

Can you see the second line?

"If tobacco companies lie, so do we." (Laughter) (Applause) But I did it.

This was put up all over New York in one night, and quite a few people looked back at it.

(Laughter) It was made to look serious.

It wasn't some weird fake thing, it looked like the real thing

This is a poster for the Atlantic Center for the Arts in Florida

The last time I went to the Caribbean for Christmas

It's a product I found, but I wonder if there's a demand for people who want to whiten their skin in this day and age.

I don't know if it was just sold in a new package or a new product, but I was surprised.

We run workshops all over the world, and the challenge was to design a new toilet sign.

(Laughter) That's one of the good things.

Students actually put this up in the restrooms of bars and restaurants, and you can imagine the confusion that an elderly couple might have.

(Laughter) A few years ago, I worked for Microsoft.

A global brand campaign

The interesting thing is that I'm from a sociology background, and I've never studied design, so sometimes people say, "That's why," but it was an interesting experiment because it wasn't about selling a product, it was just about improving Microsoft's image.

They noticed the existence of antis, didn't they?

(Laughter) After doing this global campaign, I found that to be true.

The goal was to humanize the brand, something that hadn't been done in previous campaigns, and put words and people into the ad that no one had remembered or talked about.

I wanted to tell you that there are good people at Microsoft.I wanted to tell you that there are good people at Microsoft.

It was part of the "It's good to be Monday" campaign

I tried to turn the negative aspects, such as excessive competitiveness and long working hours, into positives and take a closer look.

I'm glad it's Monday I can go back to my little desk behind the gray wall and listen to everyone talk for 10 hours and go back home

This is one of my favorite advertisements.

The word "let's go on an adventure" and the image of the software

This format was advertised worldwide

However, in Germany, one part was changed without my permission.It's through an advertising agency, so you don't need my permission, but can you see the difference?

This is the advertisement that went around the world. There is one part that is different in the German version.

(Laughter) There are two problems.

If it was going to be used in advertisements, I would have liked it to be a little more lively child.

(Laughter) This kid is in front of the computer.

I feel like I'm waiting endlessly to see when it will start

(Laughter) The advertising agency said, "We don't have black people in Germany, so why should we have black people in our ads?"

I get what you're saying, but I didn't think so. I think it's a narrow-minded approach. Now that the world is so global, I don't think the German people would have had a problem with black girls.

Work done for Ray Gun magazine

The significance of this magazine is to read articles, listen to music, and interpret it.

nothing has been decided

This is an article by Brian Eno, designed in my own personal interpretation.

Rock stars talk about the teacher they fell in love with (laughs)

Ray Gun magazine has a lot of excellent articles.

I was lucky to find a photo of the teacher sitting on top of a book.

(Laughter) The article about Bryan Ferry was so boring that I made the whole article an emoji.

(Laughter) You can underline the important parts, you can even convert it to a different typeface.

If you want to read it, you should be able to decipher it.

(Laughter) I've done a lot of magazine work, and I've been curious about how big magazines handle major events.

What's really disappointing is that both magazines have chosen photos of moments of collision that readers have already seen hundreds of times.

Personally, I think People magazine chose the best photo.

I don't know how to say it well, but the second plane hasn't crashed yet. It was the moment when I was fascinated by something.

But when I opened the magazine, it was so bloody

Photos of dead people on the left, people just running away

Advertisement of new support bra next to it

You didn't remove the right page for advertising.

Look at this woman on the left, I can't imagine how hard it must have been.

If someone jumps off the building, it's only natural Unfortunately, the composition of this spread itself is good

This is the case throughout this special issue

I'm really sorry it happened

Advertisement "Detergent that fits everyone"

Many children became orphans on this day

I think it would have been much more appropriate if I had put a blank sheet here instead.

This is the worst example Two women in jeans looking in the same direction

One is in unimaginable pain, while the other is preoccupied with posing and milk.

A few months later, I had the opportunity to give a lecture in New York, and one of the audience said to me, It was actually an email, but when I thanked him for the lecture, when he returned to his car after the lecture, he found a poster on the car, and after the tragedy, he thought that New York was finally gradually returning to its usual New York.

this is the sticker

(Translation: Thank you for your hard work in parking too close. Next time you need a can opener, I can't get out of my car, so you bastards like you can get on the bus.) There aren't many chances to be happy to find a poster like this, but I was happy that it was like a sign that I had returned to normal.

this is my desktop

I was told today that there are things called folders, but I don't really know what they are.

This is my lecture notes

Just a little more

This is a new product I found in an airplane catalogue.

I don't know where to go, if you want to spend more time in front of your computer than ever before, you can buy a keyboard with a plate on it.

It's convenient. Take a bite of pizza, type...

But I don't know if this is a good thing

If you doubt how influential graphic design can be, this poster is powerful. It means nothing more than "Vote for Hitler."

Nonetheless, this is an example of a design that evokes a very strong feeling, even though it was just a mediocre poster at the time.

Now about humans

As humans have advanced technologically, humanity has become more important than ever.

I have to bring out my personality in my work

You can only pull yourself out of yourself.No one can pull out your background, your parents, your upbringing, all your life experiences.

If you can do that, it's the only way you can do your job, and most of all, you'll enjoy it.

I love found art, and handwriting is all the rage these days, and I thought this was a great example.

Advertisement looking for stray dog ​​Pitbull

I've underlined and emphasized that this dog is friendly, so I guess you can't spell Hercules or Hercules.

(Laughter) Above all, I'm offering a $20 bounty to try and find this dog.

You're kidding, go find this lost dog for $20

I can see people walking down the alleyway shouting Hercules, and then this vicious dog jumps up and wishes it was Hercules, that friendly dog.

(Laughter) You wouldn't have found the dog, because you took the poster.

(Laughter) A few years ago, I was asked to speak at a conference in Sacramento.

Courage is the theme, and I asked you to tell me about the courage to become a graphic designer.

It reminded me of this photo of my father who was the test pilot. My father told me that if you decide to become a test pilot, you'll be told that 40% of you will have a 50% chance of dying.

It's a lot more dangerous than normal work

(Laughter) The country builds an airplane and asks, "Would you like to take a test ride?"

Some survived, some didn't.

I also thought about the decisions I made, like whether to choose a typeface, Mincho or Gothic.

(Laughter) Most of the time it's not a matter of life or death.

Then why not experiment and have fun

What's wrong with using your personality in your work?

When I was a teacher, I used to ask my students: What is the definition of a good job?

As a teacher, I want to give the correct answer after listening to the student's answer.

I'm sure you've heard this before, but what I think is the best definition of a good job is, if you can afford it, will you keep doing the same job for free?

if so, great

If not, what the hell are you doing now?

I can't say I'm alive

thank you for listening

What's happening in genomics, this revolution is about to overturn everything we know about the world, life, ourselves, our perceptions of them.

If you've seen "2001: A Space Odyssey," you probably remember the theme of boom-boom-boom, the monolith, and Arthur C. Clarke's representation that we were at a critical juncture in our evolution.

Monkeys learned to pick up bones and use them as tools, and by using them, monkeys that had been just running around and eating and reproducing learned to use tools to make things.

So we evolved to the next stage

As you know, especially in the last 30 years or so, knowledge and technology have advanced at an accelerated pace, and technology is creating more knowledge and giving us new tools.

we have encountered many important events

In the '70s and early '80s, we had minicomputers. Who would have thought then that we would have not only one computer per person, but 20 of them.

If you go outside, the car has 12 CPUs.

And in the meantime, we created the Internet, connecting the world and flattening the world.

We've gone through so many changes that we've created the tools we have today, and smart tools make us look inward and focus on what we have in common: our genome.

How is your genome doing today? Have you thought about genomes lately?

Have you heard of it? You've probably heard of the genome recently.

Let me tell you a little bit about what a genome is.

It's like asking someone, What are megabytes and megabits? What is broadband? and

No one wants to say they don't understand

that's where i come in

You've heard of DNA, you've probably studied it a bit in biology.

The genome is all of the DNA that an organism has

What all life has in common is DNA

Whether it's yeast, mice, or flies, all life has DNA.

DNA as a word makes up genes and chromosomes.

When Watson and Crick first unraveled the beautiful double helix structure known as the DNA molecule in the '50s, it's a very long and complex molecule, but that's when we started to realize that in our DNA there's a language that determines who we are, what traits we inherit and what diseases we get.

At the same time, it turns out that this is a very ancient molecule, because all the DNA in our bodies has been around since the dawn of time, it's been there since the beginning of our lives.

History is stored in DNA

The history of our species lives in our genomes, and it's about to reveal where you came from as a human being, going back thousands of years, tens of thousands of years.

But the truth is that the genome is also an operating manual.

It's the program, the code of life

It's what makes you work, it's what makes every living thing work.

DNA is a very sophisticated molecule

long and complicated

All you need to know is just four letters, A T C G, each letter representing a certain chemical.

You can make a language out of those four letters, a language that can express any complexity.

These letters usually pair up to form words called base pairs.

If you think about it, what that four letters represent is what drives us.

It's hard to understand, so let's take a familiar computer as an example.

If you look at this screen, you can see images and words, but it's really just a row of ones and zeros.

The language of computers is binary.

The digital world consists of a series of 1's and 0's that are transformed and represented.

So when you're listening to iTunes or your favorite music, it's really just a string of 1's and 0's playing at high speed.

These images are also made up of 1's and 0's, and when you're talking on your cell phone, your voice is converted into 1's and 0's over the network and magically flies.

There are so many wonderful, complex things that we've created with just 1's and 0's.

Now let's extend it to four letters, and then the complexity will increase, and we'll be able to express even more complex mechanisms.

let's talk about what that means

If you look at the human genome, it's made up of 3.2 billion base pairs, that's a lot.

It's the various combinations that make up humans.

By the way, if you convert it to binary and compare the size of the programs, the human genome is actually smaller than Microsoft Office.

It's not a surprisingly large amount of data.

By the way, we're just as buggy as the office.

(Laughter) This belly is a bug in my genome, and it's been bothering me for years.

It's a genomic bug that makes us sick

At the moment, many diseases that have plagued us for so long, like cancer, cannot be cured because we don't know what kind of genomic abnormality the disease is.

Now the mystery is beginning to unravel

So far, our treatment has been a "bad gun, a few shots and it hits" method, which is like, let's give them this chemical, and we'll do something about it.

But why do normal cells become cancer cells?

what programs cause cancer

If you know what command causes cancer,

Treatment can be considered and established

Here are some tips for enjoying dinner with a good glass of wine.

We have about 24,000 functional genes.

And then there are 120,000 other genes that don't seem to function normally, that go back tens of thousands of years and show how we as a species have lived historically.

Interestingly, mice have about the same number of genes.

When we looked at the genome of the Pinot Noir grape, we found that it also contained about 30,000 genes, so the number of genes doesn't necessarily represent the complexity of a particular species or how it evolved.

Just look around you.

There are handsome people, cute people, slender people, chubby people, people of different races and cultures, and so on.

A 0.01% genetic difference creates these differences.

It's the tiny differences that ultimately make the difference between humans and other species.

Now we can already decode the genome.

It took ten years and three billion dollars to decode the first human genome.

It's the work of Dr. Craig Venter.

Then DNA co-discoverer James Watson spent $2 million to sequence the genome in just two months.

If you look at the computer industry, big computers are getting smaller and faster and more powerful. Genetic sequencing is no different. It's only a matter of time before we can sequence the human genome for $5,000 and less than an hour.

Then you'll be able to put your genomic information on an electronic card and carry it around with you, something like this.

When you buy medicine, don't buy generic medicine

If you give your genomic information to a pharmacist, they'll prescribe a drug that's right for you, and it'll work much better than traditional drugs, and it'll have no side effects.

No sticky poop or weird side effects like they say in the commercials.

The day will come when all those things will disappear

what does the genome look like

This is a very long strand of base pairs.

The mouse genome is almost identical to the human genome, but scientists are now investigating their functions and implications.

The genome initiates the expression of various genes.

For example, in the vine, some of the first sentences are Roots, branches, and flowers.

In humans, in this area, should we make blood cells or cause them to become cancerous?

In my case, save every calorie you take in, and I'm from a cold climate.

For my wife, she can eat as much as she wants three times a day and not gain weight at all.

It's all written down in this code, and it's executed very quickly.

So what can we do with the genome that we can decode?

There's a lot you can do, and it's exciting

Sometimes I feel scared. Let me tell you a few things.

First of all, you can learn about the history of various organisms.

It's a very simple test.

You can trace your ancestral roots, and you can trace your family tree back thousands of years.

You will understand the function, which is very important.

For example, you can learn why plaque forms in your arteries, or what makes starch in grains, or why yeast metabolizes sugars and creates carbon dioxide.

From a big point of view, you can know the causes of various problems, know the causes of diseases, and search for cures.

When we understand disease, we can fix the problem and create a better organism.

Most importantly, we've come to realize that nature has provided us with a magnificent toolbox.

the toolbox is real

Designers far greater and smarter than us gave us a toolbox, and now we have the ability to use it.

We're trying to design the genome, not just read it.

At my company, Synthetic Genomics, we created the first complete synthetic genome of a small microbe, a very primitive organism called Mycoplasma genitalium.

If you've ever had a urinary tract infection, it might be because of this tiny microbe.

It's a simple organism with only 246 genes, but they've succeeded in completely synthesizing its genome.

If we have a genome, what if we put this synthetic genome in place of the old one, and it kicks in and starts life?

that's right

Not only that, but if you take that synthetic genome and put it into another organism, like yeast, the yeast turns into a mycoplasma.

It's like booting a PC using a Mac OS.

you can do the opposite

You design a genome, you put it into an organism, and the software changes the hardware, so to speak.

this is very serious

Last year, France and Italy announced that they had worked together to sequence the Pinot Noir genome.

They say they've sequenced the entire Pinot Noir genome and identified 29,000 genes.

We've also discovered the metabolic pathways that produce flavor, but these flavorants have to bind to tongue receptors in our genomes to sense flavor.

We also learned that there are so many different mechanisms that create scent.

We also found regions representing susceptibility to disease.

Research continues, and we're further characterizing this plant by deciphering the complete genome and understanding how it works.

what shall we do there

We can read the genome, we can design it, we can change it, we can redesign it from scratch.

Will you make a new breed called franken noir?

(Laughter) Helps improve grape varieties.

By the way, if you're worried about genetically modified organisms, every grape here and everywhere else is already genetically modified.

Grapes grown by grafting rather than from seed do not exist in nature.

don't worry i've been doing it all along

Let's focus on improving disease resistance, and increasing yields doesn't necessarily require dramatic farming techniques or costs.

We could also consider expanding the climatic conditions in which it grows. Pinot Noir might even grow on Long Island.

(Laughter) Maybe we can improve the taste and smell as well.

Add a little more raspberry or chocolate flavor

It's conceptually possible to do all of this, and I think it's possible.

But there is an ecosystem here

So we're not the only species living on their own, we're part of a huge ecosystem.

I hate to tell you, but the fact is, there are about five kilograms of microbes in your digestive system, circulating in your gut.

The oceans are also full of microbes. In fact, when Craig Venter sequenced microbes in the oceans, the number of known species on Earth tripled in three months, and so many new species were discovered even at a depth of six meters.

It turns out that such microbes have a huge impact on the climate, regulating carbon dioxide and oxygen, even more than plants supply oxygen to the atmosphere.

Microorganisms are everywhere on earth: ice, coal, rocks, volcanic craters, it's amazing.

And what we've learned about plants, just as we've learned more about their genomes, is that the ecosystems that surround them, the microbes that live in their roots, have as much power to determine plant characteristics as the plants' own metabolic pathways.

If you look closely at the roots, you'll find that they're inhabited by a wide variety of microorganisms.

This is well known to grape growers, they pay attention to water and fertilizer.

That's what I call "bad guns hit a few hits" pharmacy.

We don't know exactly which microbes produce which flavors and properties.

I'm starting to understand that

We talk about vineyards, we worship vineyards, we say things like, "My vineyard is amazing, it's so beautiful."

"Took this land and created an unbelievable vineyard"

Yes, we do have a lot of discussions about vineyards, duh the climate, duh the soil, whatever, but I guess what.

We can figure out what a vineyard is in the first place.

Once the nucleotide sequence is determined, we will know

there are thousands of species of microbes

Unlike humans, it's easy to determine the base sequences of microbes. Because there are about 1,000 to 2,000 genes, we can know what microbes are.

You go to the fields, you dig the soil, you find those bacteria, you sequence them, you associate them with positive and negative traits, and you end up with a huge database that you can fertilize.

Now you know what a vineyard is

People ask, "Are we imitating God?"

Are we imitating God when we manipulate living things?

It's a question people often ask James Watson, and his answers are sometimes politically controversial.

(Laughter) I asked, "Are you imitating God?"

Watson gave a very pertinent answer, "Someone has to do it."

(Laughter) I consider myself to be a very spiritual person, but I don't think there is anything that isn't natural when you put aside the established religion.

I don't think chemicals are unnatural either.

I said earlier that I would talk about unpleasant things

It's simple: you don't invent molecules and compounds.

existed in the universe from the beginning

We'll reconfigure and change matter, but we won't make things that aren't natural.

There can be negative consequences, we may pollute ourselves, we may pollute the planet, but that is the natural result of failure.

What's happening today is that we've realized that the toolbox that nature has gifted us with is very deep.

Amazingly, there are microbes that make gasoline.

Microorganisms. Remember yeast.

Microorganisms are chemical factories Nature has created the most sophisticated chemical factories, and now we can use them.

But there are also some rules

Nature doesn't allow us to break its laws, and we can change the grape variety.

You can't make a vine give birth to a baby.

There are laws in nature

We can work within the rules, but we can't break them. We're learning what the rules are.

So the question is, if we can cure all disease, if we understand how we get sick, we can drive disease out, if we can create nutritious, healthy plants that can grow in challenging environments and end hunger, and if we can create abundant clean energy -- in the Synthetic Genomics lab, we have a single-celled organism that absorbs carbon dioxide and produces molecules that are very similar to gasoline.

It's carbon dioxide, it's not sugar, it's not something else, it's what we want to get rid of.

You can get extremely pure lipids with just carbon dioxide and a little sunlight.

It's a way to solve our energy problem. We'll use less carbon dioxide. We'll have cleaner oceans. We'll make better wine.

Would you do it if possible?

I think the answer is simple: working with nature and harnessing this well-understood toolbox is the next step in human evolution.

Lastly, I want to say good health for the next 20 years.

By that time, we may live 150, 300 years.

thank you

What's inside this metal cylinder is either a revolutionary technology or a useless piece of crap, depending on whether we can harness the strange physics of matter on a very small scale.

In order to have the opportunity to do so, the environment needs to be precisely conditioned. The thick tabletops and legs protect against footsteps and vibrations from near elevators and from opening and closing doors.

The cylinder is a vacuum vessel, so there's no gas in the air.

Inside the vacuum vessel is a smaller, extremely cold compartment that can be hit by a very weak laser beam.

Inside it resides the highly sensitive particles that make up a quantum computer.

What value are these particles worth?

Theoretically, quantum computers could exceed the computational limits of classical computers.

classical computers process data in bit form

Each bit can switch between two states, 0 or 1.

Quantum computers use something called qubits that can transition between 0, 1, and superposition states.

When a qubit is in a superposition state, it contains more information than it does when it's just a 1 or a 0.

Let's think of these states in terms of points on a sphere, with the north and south poles of the sphere pointing to 1 and 0.

A bit can only switch between these two poles, but a qubit in a superposition can move to any point on the sphere.

We can't pinpoint exactly where that point is, but the moment we read it, the qubit is either 0 or 1.

But even if we can't observe the qubits in the superposition state, we can still manipulate them in certain ways while they're in this state.

Now, as problems get more complex, classical computers require more bits to solve them, but quantum computers can theoretically handle much more complex problems without requiring as many qubits as classical computers.

The unique properties of quantum computers result from the behavior of atoms and subatomic particles.

These particles have quantum states, which correspond to the states of a qubit.

Quantum states are so fragile that they are easily destroyed by changes in temperature or pressure, wandering through electromagnetic fields and colliding with nearby particles.

So quantum computers need to be elaborately made,

And that's why, for the time being, the capabilities of quantum computers remain mostly theoretical assumptions.

Right now it's just controlling a few qubits in the same place at the same time.

There are two factors in effectively controlling a mutable quantum state: the types of particles that a quantum computer uses, and the method of manipulating the particles.

Currently, the two most advanced methods are ion traps and superconducting qubits.

An ion-trap quantum computer uses ions as particles and manipulates them with lasers.

That ion is in a trap surrounded by an electric field.

By shining a laser, we can manipulate the ions and rotate the qubits around the sphere.

So to give you a simple example, you type in a question with a laser, "Factorize 15."

To answer, the ion emits a photon, and the state of the qubit determines whether the ion emits a photon, and how many more.

An imaging system collects the photons, processes them, and gives the answer, which is three and five.

Quantum computers with superconducting qubits do the same thing in a different way, using chips with (quantum) electronic circuits instead of ion traps.

The state of each electronic circuit is transformed into the state of a qubit

Sending and manipulating microwave electrical signals

In other words, qubits are made up of ions or electronic circuits that work with lasers or microwaves.

Both methods have their pros and cons

Ions can be manipulated with great precision and have long durations, but as you add more ions into the trap, it becomes harder to precisely control individual ions.

Right now, we can't put enough ions into the trap for advanced computation, but a possible solution is not to build one big trap, but to connect many smaller traps together and communicate by means of photons.

Superconducting circuits are much faster than ion traps, and it's easier to add more circuits to a computer than to add more ions.

But circuits are more fragile and have a shorter lifespan.

And while quantum computers are evolving, they're still subject to environmental constraints to keep the qubits state.

Despite these barriers, we've already been able to go inside and compute in the unobservable realm.

The future we create should be a future we can be proud of

I think about these things every day, or rather, this is my job.

I'm the co-founder and senior columnist of Worldchanging.com.

Since its founding with Alex Steffen in late 2003, Worldchanging has worked with a growing team of contributors around the world to document an ever-growing number of solutions, ranging from those in use today to those nearing completion.

In just over two years, we've picked up about 4,000, from reproducible models to technical tools to burgeoning ideas, all with the goal of a more sustainable planet, a fairer and more desirable future.

Our organization is intentionally focused on solutions.

For example, if you want to be up-to-date on how rapidly the state of the world is deteriorating, there are endless sources of information available online and offline.

The purpose is to suggest what can be done about this situation.

Our main focus is on the global environment, but we also cover international development, international conflict, the responsible use of emerging technologies, and even the rise of a second superpower, and so much more.

The range of solutions covered is pretty broad, but that means the breadth of the challenges that need to be addressed and the breadth of innovation that's available.

So I'm going to give you a quick rundown of just a few of them. I hope you get the gist of it. For example, inflatable concrete shelters for quick recovery in the event of a disaster, flowers that change color in the presence of landmines, a novel use of life sciences, these are ultra-efficient designs for homes and offices. We're improving it so that we don't have to drive as much, we're using biomimetic technology to take advantage of the efficiency benefits of natural forms, we're designing cars and buildings, and there's even a decentralized information processing project to model the climate of the future.

Also, some of the topics we're covering at TED this week have been previously featured on Worldchanging, including cradle-to-cradle design, MIT's Fab Labs, the fate of extreme longevity, and the One Laptop per Child project, Gapminder.

I was born in the mid-1960s, Generation X, and my 40th birthday was just around the corner, and I was naturally pessimistic.

And what I've learned is that people who see nothing but bad outcomes are blind to the very possibility of success.

According to Norwegian social scientist Evelyn Lindner, "In a boom, pessimism is arrogance.

Depression pessimism is a self-inflicted, self-indulgent word of death.”

The truth is, we can make the future better, we can do it now.

As you just saw, there are tools for that, and new tools are emerging all the time.

Humans have knowledge, and our understanding of the planet is growing every day.

And above all, we have a motive.The world has to change, and there is no one else to do it for us.

Many of the solutions we've found and covered on Worldchanging share common traits: transparency, collaboration, willingness to experiment and an understanding of science, or rather "is science"!

(Laughter) Most of the models, tools and ideas that we feature are a mix of these properties, so let me give you a few examples of how these concepts can come together to change the world.

A tool that makes the invisible visible has value as something that can change the world. In other words, it's a tool that enables us to see situations that would otherwise be barely perceptible.

Because people often try to change when they know and understand the consequences of their actions.

A small example that is very familiar to us is the way drivers change the way they drive in cars that have real-time fuel economy gauges that accurately reflect the way they drive that affects the fuel efficiency of the car.

In the last few years, there have been so many innovations in the world that can measure and display things that are too big, too vague, too elusive.

Simple technologies, such as this wall-mounted device that can tell you how much electricity you're using in your home, or that can tell you what happens if you turn off a few lights in a room, are technologies that can have an immediate effect on your personal resource consumption.

In terms of community tools, a system that sends notifications via text messages when pollen counts are high, when smog levels rise, and when natural disasters are approaching.

Data-rich displays, such as campaign donation maps or maps of disappearing ice sheets in the Arctic, can help us understand the flow and context of processes that affect us all.

Research projects aimed at addressing global health needs through open data and collaborative action have the potential to change the world.

Now, some people say that knowing too much can sometimes lead to disaster, but I'm convinced that the solutions that knowledge provides are far more important.

Free-access journals, such as the Public Library of Science, where cutting-edge scientific research can be read for free by anyone, anywhere in the world.

In fact, a growing number of scientific publishers are adopting this model.

Last year, hundreds of biologists and chemists from around the world came together and worked together to sequence the genome of a parasite that causes one of the worst epidemics in the developing world: sleeping sickness, leishmaniasis and Chagas disease in Africa.

This genomic data, now available in open-access genomic databanks around the world, is a great ally for researchers looking for therapeutics.

But my favorite example is the 2003, 2004 SARS epidemic, and what made the world's response to SARS possible was the availability of the entire genetic sequence of this virus from anywhere in the world.

It was then that the National Research Council, in a later report on the SARS epidemic, reported that the public availability of gene sequences was a crucial factor in the rapid development of a treatment for SARS.

And the world-changing potential lies in something as mundane as a mobile phone.

I can probably count on one hand the number of people in this auditorium who don't have a cell phone. i must not have a cell phone

(Laughter) For many people, their mobile phones have become a very part of themselves, and now people are definitely beginning to realize the transformative potential of mobile phones.

You already know a few big-picture aspects, like how camera phones outsold all cameras worldwide last year, and how the number of people whose lives are being exposed online through the lens is on the rise, and sometimes even makes it into the history books.

Mobile phones are driving economic development in developing countries.

Last year, a study found a strong correlation between increased mobile phone usage across Africa and subsequent growth in GDP.

In fact, in Kenya, mobile phone minutes are traded in exchange for money.

The political side of mobile phones can't be ignored, either, from mass texting in South Korea as part of the regime overthrow campaign, to Britain's Blair Watch project, which is a play on movies to keep an eye on politicians who avoid the press.

(Laughter) These trends are still accelerating.

Uninterrupted, pervasive networks, high-quality audio and video, designed to be worn rather than carried in your pocket, will transform our lives on a scale most people cannot comprehend.

It's no exaggeration to say that mobile phones are one of the most important technologies in the world.

In today's fast-paced world, it's not hard to imagine a future world in which mobile phones are used as a medium of communication, but in a far different way.

On Wednesday, Peter Gabriel gave a very moving talk about the Witness project, and I've been a fan of this project for a long time.

When I found out Witnesss had a web portal where I could take videos from my digital camera or camera phone and post them over the internet, I was super excited, so I didn't have to physically carry a videotape.

Not only will there be new and safer channels for documenting and exposing violence and injustice, but Witness will also be brought to the attention of the world's ever-increasing digital generation.

Now, how does this work as a system to connect environmental activists?

What if there was a web portal that collected the records and evidence of the changes that were taking place in our planet's environment, where all sorts of people posted news and data from their own devices, from activists and researchers to businessmen and politicians?

It puts the spotlight on the ongoing environmental change and, more importantly, empowers those who are willing to move to create a new world, a better world.

This system will give ordinary citizens a chance to play a role in protecting the planet.

Well, in short, the "Earth Witness" project is ready.

And let me be clear, the name "Earth Witness" is part of the plan, and I'm just using it as an abbreviation for an idealized representation of this virtual project.

You could just call it the "Environmental Transparency Project" or the "Smart Mob Project to Protect Nature," it's just easier to say "Earth Witness."

Now, many of the people involved in this project will be focused on man-made and non-man-made environmental problems, especially environmental crime, and major sources of greenhouse gases and exhaust emissions.

this is natural and important

Because if we can put back what's been destroyed, we should do a better job of documenting what's going on on Earth.

But at Earth Witness, you can talk about anything.

Another use of Worldchanging is to list the best ideas, the successful projects, the more noteworthy efforts to change the world.

Earth Witness shows us two worlds: the world we're trying to change, and the world we're building for generations to come.

What's great about this vision of the future is that you can act now.

The key parts are already everywhere

A mobile phone with a camera is absolutely essential.

For most people, the mobile phone is currently the best, always-on, anytime-anywhere information tool.

You can forget your digital camera, but very few people forget their cell phones.

One of the possible scenarios for this scenario is building your own mobile phone.

Over the last year, open-source hardware hackers have come up with different models, like Linux-powered mobile phones, and the Earth Phone, which could be born out of this line of projects.

At the other end of this network, there's a server created for people to send photos and messages to, and this server is accessible over the internet, and it's a combination of a photo-sharing service, a social networking platform, and a collaborative filtering system.

If you're into Web 2.0, you know what I'm talking about, but everyone else, for those of you who are completely gibberish on the terminology I just used, in simple words: the online part of the Earth Witness project is created by users openly and collaboratively.

This alone might be enough to create an epic chronicle of the changes that are happening on our planet, but there is more we can do.

The Earth Witness website can also be used as a collection point for all kinds of global environmental data collected by environmental sensors on mobile phones.

This sensory capability isn't on cell phones yet, but engineers and students around the world are experimenting with air sensors attached to bicycles, handheld devices, cheap robots, pigeon butts, and a real-life project at the University of California, Irvine, to measure smog-producing air pollution with sensors attached to birds.

From here, you can easily imagine attaching the same thing to the mobile phone that people carry.

Now, the idea of ​​having sensors in mobile phones is nothing new. Manufacturers around the world are launching mobile phones with built-in features such as bad breath detectors or warnings about high UV levels.

Uppsala Biomedical, a Swedish company, is making a more practical mobile phone that can do on-site blood tests, transmit the data, and display the results.

Even Lawrence Livermore National Laboratory is doing something similar, where they're prototyping cell phones with radiation sensors to look for pollution bombs.

With the vast array of small, inexpensive sensors available on the market, it's not hard to imagine the possibility that someone could develop a cell phone that could measure things like temperature, carbon dioxide, methane gas levels, presence of biotoxins, and maybe even the H5N1 avian flu virus in a few years.

One project that really fits this kind of system is Larry Brilliant's InSTEDD.

Now, all of this data could be geo-tagged and associated with an online map for easy viewing and analysis.

I think this is worth mentioning

The impact of open access online maps in the last year or two is absolutely staggering.

Web developers around the world have come up with an incredible number of ways to overlay useful data on maps, such as bus routes, crime statistics, and bird flu epidemics.

Earth Witness doesn't stop there, it connects what an individual sees with thousands and millions of people around the world.

It's exciting to think about what things could be achieved if something like this existed.

Now, we know much more about what's happening on Earth than what satellites and a handful of government sensors can gather.

It will be a bottom-up, collaborative approach to environmental awareness and conservation. It will allow us to respond to emerging environmental concerns like a "smart mob."

Most importantly, we cannot ignore the importance of mobile phones to children around the world.

It's a system that will enable the next generation to be at the forefront of environmental data collection.

Every little bit of information is needed in our efforts to find ways to mitigate the worst effects of climate change.

A system like Earth Witness would allow all of us to contribute to the advancement of human knowledge, and ultimately to the betterment of the planet itself.

Now, as I said at the beginning, there are thousands of good ideas coming out all the time, but do you know why I've been talking about non-existent projects for over a dozen minutes now?

Because this is what tomorrow will be like, because it's technology-enabled bottom-up, global collaboration that will help us meet the greatest crisis since the dawn of civilization.

We can save the planet, but we can't do it alone, we need each other.

No one is going to save the world, it's just that if we all work together and take equal advantage of technological innovation and human communication, maybe we can do something about it ourselves.

Within our reach, we have a wealth of compelling business models, powerful tools, and innovative ideas that could make a meaningful difference in the future of our planet.

You don't have to wait for the magic bullet to solve everything, there's already a medicine chest full of solutions, all you have to do is use it.

It's incredible how many groundbreaking solutions have already been announced in various fields, and all of them, if we were willing to use them, could save the planet.

As the saying goes at Worldchanging: it's not possible to create another world, another world is here.

we just need to wake up thank you

I've been requested to talk long term today, and I'm going to talk long term about three of the biggest problems facing humanity.

Some overlap with other speakers, but I think that's a good thing.

Because it means that the issues I'm going to talk to you about today are very important to me.

The first problem is death, which is a big problem.

Statistically, we're out of luck.

Nearly everyone who was born is now dead.

About 90% of people who have ever lived are dead

So 150,000 deaths a year, excuse me, 150,000 deaths a day, which is a big number by any standards.

56 million people die each year

The single biggest cause of death is old age, about two-thirds of all deaths are from old age.

More people die of old age each year than the population of Canada.

Sometimes we don't realize the problem, or the problem is too familiar

for being too big

I think death is too familiar and too big for most people to perceive as a problem.

If you think about it, you'll realize that they're not statistical points.

about 3 minutes

So roughly 324 people have died since I started speaking.

Roughly about the number of people in this hall died.

Now, the human cost of this is obvious, not to mention the grief and loss, but it's also very wasteful.

For example, information, knowledge, and experience are lost through natural death in general, and aging in particular.

For example, let's compare one person to one book.

Of course, one person one book is an underestimate.

The amount of things a human being has learned and experienced in a lifetime cannot be summarized in a single book.

But here, as an example, let's assume that each person has one book.

52 million people die of natural causes each year, which means 52 million books are lost.

The Library of Congress has a collection of 18 million volumes

The destruction of the Library of Alexandria

It's a huge cultural loss, and it's still talked about today.

The number of deaths per year is equivalent to three books in the Library of Congress being burned and lost forever.

So death is the number one big problem.

I wish Aubrey DeGray and others like him the best of luck in stopping death as soon as possible.

The second big problem is the threat of human extinction.

This is a threat in terms of long-term species conservation.

Let me explain why I take issue with this.

Let's start by looking at probability, which is very difficult to estimate, but surprisingly there have been only four studies on this subject in recent years.

This human extinction crisis is such a big problem that you would think it would be an interesting subject to study, but there's been a lot of lack of attention in this area.

That said, four studies have been done, one by John Leslie, who has also written a book.

Leslie puts a 50% chance that humanity will not survive the end of the 21st century.

Similarly, the Royal Astronomer, who gave a speech yesterday, puts it at 50%.

The other author, who doesn't give numbers, said the chances of survival were very high.

I wrote a long paper on this subject

In my paper, I said that less than 20% is too low to judge in the light of the current situation.

Here's what I've actually calculated, but don't take it too seriously, but there seems to be a consensus that there is considerable risk.

Everyone who saw and studied this calculation was convinced

Now, if we could reduce the chances of human extinction by 1 percent, 1 percent is a small amount, but it would save 60 million lives, given the current world population.

6 billion people, so 1% of that is 60 million people.

If you think about it, 1% is a big number.

If we include future generations in our calculations, which may not exist if our generation fails, the results will be astronomical.

If humans could eventually settle somewhere in the universe, say, the Virgo supercluster, it would take 100 million years to get there, but if you're not alive, you'll never get there.

Even reducing the risk of human extinction by just 1 percent is equivalent to this astronomical number: 10 to the 32nd power.

So, with future generations in mind, moral imperatives about the cost of charity are trivial.

What we need to focus on is how to reduce the risk of human extinction, because if we can reduce the risk of human extinction even by a small amount, it will lead to big gains that would not be achievable in any other way.

Reducing the risk of human extinction is a priority, even if we only think about the present generation and do not take into account the potential for future generations that will be lost if the present generation goes extinct.

Now let's use all the remaining time to explain the third problem, which I think is more vague and difficult to understand.

Everyone, look back at your life, some of you have never experienced it, and some of you have, when life was wonderfully rosy.

It could be a moment of great creative inspiration, when you walk into this room.

It may be the moment when you understand something you didn't understand before.

Maybe it's time to fall in love romantically

It could be when you touch something beautiful, like a sunset or a work of art.

Sometimes we have moments like this, and life seems good when it's going well.

On the other hand, why isn't life all about good times? I also have a question

people tend to get attached to this

And then, of course, we're pulled back into the mundane, and the memories fade.

Also, in our normal state of mind, it's hard to remember how wonderful life is when things are going well.

And on the other hand, how hard life is when things go wrong

The third problem is that life isn't all good.

i think this is a big problem

It's easy to say bad things

I can give many examples: disease, untimely death, needless suffering, abuse, stunting, forgetfulness, ignorance, lack of creativity.

Suppose we could solve all these things

great success

I was able to get rid of all the bad things

Will the result look like this slide? No, it will be much better than this.

Is this really what we want?

Is it possible to do only this much?

Is there something more worth doing?

When you think about it that way, I think it's pretty clear that there are many ways that things can change, not just by removing the bad, but by adding the positive.

At least on my wish list are: healthier and longer life; more fulfilling life; improved cognitive performance; greater knowledge and understanding;

What do we have to change to make these things happen?

I'll tell you the answer, we have to change ourselves.

Not only the world that surrounds us, but also ourselves.

It's not just what we think of the world, it's also our own biological being.

We have to change the way people are

Now, when we think about changing the human condition, the first thing that comes to mind is human modification techniques like growth hormone therapy, cosmetic surgery, psychostimulants like Ritalin and Adderall, antidepressants, muscle building drugs, artificial hearts.

It's a really miserable list

They're very helpful for a very small percentage of people, for those who suffer from certain conditions, but for most people, they don't help them to live a human life.

And to all of this, most people would intuitively feel uncomfortable, and yes, you need antidepressants to treat severe depression.

I have an unnatural feeling that something is wrong

Even if we don't rely on that, we already use a lot of technology to modify and improve.

For example, an extension of skin is clothing.

As far as I can see, everyone in this room is a user of this improved technology, which is great.

Mood-altering substances have been used since time immemorial: caffeine, alcohol, nicotine, boosting immunity, improving vision, anesthesia, and so on.

Birth control pills, cosmetics, mind-rewriting techniques may sound eerie, but the distinction between technology -- typically tools -- and other ways of changing the human condition is really blurry.

For example, learning math or reading and writing is really, quite literally, reshaping your brain.

As you learn, the microscopic structure of your brain changes.

So, in a broader sense, when we talk about technology, it's not just about these devices.

The way organizations are organized also has a huge impact on human nature.

Looking ahead, it's almost certain that sooner or later these technologies will be developed.

We are oblivious to the timelines in which different technologies are developed, but all technologies are based on existing knowledge, the laws of physics and chemistry.

Apart from the possibility of human extinction, we can assume that sooner or later we can develop all of these things.

Even a small fraction of these technologies will change the way humans behave.

So let's focus on the areas of human existence that can be improved.

Healthy life expectancy is an important and urgent issue.

Let's take a look at the Intellectual Abilities box, which has a lot of items: memory, concentration, mental power, comprehension, empathy.

these are awesome

One of the reasons we place so much weight on these is that they lead to competitiveness with others, and they affect how we are positioned relative to others.

The other reason, which is why we pursue them ethically, is that they are intrinsically valuable.

I wish I could understand more about the world, about the people I interact with, and remember what I've learned.

Let's talk about senses and specific abilities

Now, the human brain is not a single information processing unit. It is composed and functioning of many modules that are specialized and evolved for a specific role.

Think about the things that we think give life so much meaning: music, humor, eroticism, faith, aesthetics, nurturing, compassion, gossiping, chatting, all of which can be attributed to specific circuits in the human brain, while allowing us to live an intellectual life that lacks these.

We're very fortunate that our brains have the ability to process music in such a way that we can appreciate it and enjoy it.

Musical ability can in principle be improved.

People with greater musical talent enjoy music more than others

It's interesting to think about other things. If all of these things lead to great values, why is it that, in the course of human evolution, our senses have evolved to allow us to recognize other possible values?

Let's assume that there are species whose brains don't have the ability to process music.

They'll be confused when they see us, when they see us listening to beautiful music like the one we just played, and they're going to be confused when we act strangely, and they can't understand what we're doing, and they're going to be very upset.

On the other hand, they may have another ability, an ability that seems as mysterious to us as they do not understand music, and it is an ability that is of great value to them.

But we are utterly incapable of recognizing such incomprehensible values.

So we can think of adding different new perceptions and thinking powers.

Self-regulation of bodily functions, morphology, and emotions

more subjective satisfaction

Ability to switch between relaxed and active states Ability to slow down and speed up as needed

To be able to switch back and forth more easily, I wish I could

honesty and caring

This is another interesting application, and one that will probably have a large social impact.

If you can choose to keep your feelings of love for a person at will, your love will never fade unless you choose to end it yourself.

I don't think it's particularly difficult.

Something that could be achieved with simple hormones or something.

It's already been successful in experiments with voles.

It's also possible to make prairie voles, which are naturally polygamous, monogamous.

All you have to do is mess with one gene.

It might be a little more complicated in humans, but it probably won't make much of a difference.

This is the last slide I want to show you, let's use the laser pointer.

Here are the possibilities of ways of being: ways of living, ways of being, experiencing, thinking, seeing, and interacting with the world.

This small area in the lower right corner is within reach of our biological faculties within this large area.

That realm is included in the realm of animals, and humans are also animals, so the realm of humans is within the realm of animals.

Now let's think about what would happen if human capabilities were improved.

If I could live, say, 200 years from now, I would be able to experience a different way of life, a different way of being.

Then you will be able to live and accumulate knowledge in a way that is currently impossible for mankind.

Then we can move into the larger realm, which is represented in this diagram as "Humanity Plus," and by repeating that process, we'll eventually be able to explore this larger potential for all ways of being.

Now why should I do this?

We already know that in this little human realm, there is a way of living that is so wonderful and worth living, and that life is so wonderful when it's going well.

There is bound to be a very worthwhile way of life in a realm much larger than the human realm shown here, perhaps far beyond our imaginations and dreams.

In conclusion, I believe that the solution to this third problem is to take the time to develop, carefully, ethically and controlledly, how to explore and explore this vast area, and discover the great value that lies within.

thank you

Let's start with this beautiful painting that I first saw as a child.

i love science fiction

This is "Space Water Bombing" (original title: This Island Earth)

Hollywood is reliable

It is said that it was completed in just two and a half years

(Laughter) Even the creationists say 6,000 years, which is Hollywood.

This movie features imaginary beings, spaceships and aliens.

Every world has aliens, and there's spaceships, and they fly at super-fast speeds, aliens.

My friend Don Brownlee and I got tired of seeing spaceships pop up every night when we turned on the TV, so we decided to write a counterargument about what the conditions are for the Earth to be habitable, what makes it an Earth, and what is a homeostatic environment that fosters not just life, but a highly evolved form of higher life.

In 2000, we wrote "Rare Earths," and in 2003, instead of looking for other planets, we asked how long the Earth lasts.

Two billion years back, the Earth no longer looks like the Earth.

Earth-like planets only exist for a very short period of time.

Thanks to Rare Earth, I was able to meet many people and learn a lot.

Shortly after publication, I was invited to a science fiction gathering, and I attended with enthusiasm.

I was going to have a debate with David Brin, and when I arrived, I was booed by the crowd of about a hundred people.

A little girl came up to me and said, "Dad says you're the devil."

If you destroy the image of aliens, everyone will hate you.

Then there was another incident, when I was talking to Paul Allen, who I saw in the audience, and handed him a copy of "Rare Earths."

Next to me, Jill Tarter turned to me and said like the girl in "The Exorcist."

“Stop!”

It's a nuisance to SETI (The Exploration Society for Extraterrestrial Intelligence).

SETI believes that there are various things in the universe.

We applaud SETI for their efforts, but haven't intercepted anything yet.

I think we should really start thinking about what is a good planet and what is a bad planet.

Now, the reason I put this slide out is, if SETI intercepted something, would we be able to decipher it?

Because this slide is going back and forth between the two minds on Earth, the Mac and the PC, and it doesn't even display the text correctly.

If an alien calls and says that we call and say Babababa ...

...that's the reason

Our planet is a good planet that can hold water.

Mars is a bad planet, but we can go and live on the surface if we have something to protect.

But Venus is bad, it's the worst planet.

It is a planet like Earth, and life like Earth may have existed in ancient times, but eventually the temperature continued to rise due to the greenhouse effect of carbon dioxide, and the surface exceeded 400 degrees Celsius.

Thanks to astrophysics, we can now predict what will happen to our planet.

Our planet Earth, in terms of life, has gone through its first harsh microbial age and is now in the cream of an Oreo cookie.

The Cambrian Explosion created life in the wetlands and made it higher, and now we're halfway there.

All animals on this planet will survive for some time to come, but only until the next microbial age.

Paradoxically with global warming, what happens is that when carbon dioxide levels drop below 10 parts per million, photosynthetic plants can no longer survive, and with it animals.

After that, the earth will live for 7 billion years.

Eventually, the sun will shine brighter, and eventually, 12 billion years from the beginning, the Earth will be absorbed by the giant Sun, and this will be all that's left.

So our planet also has a lifespan and ages, but we're at the peak of it right now.

But everything has two destinies

Many of you will die of your lifetime, but some will die tragically in accidents.

So is the fate of the planet.

For the next seven billion years, unless we're lucky enough to have comet Hale-Bopp crashing into us, or a nearby supernova explosion, Earth will be at our feet.

But what about accidental death?

Paleontologists have been analyzing death for the past 200 years, and strangely enough, the concept of extinction didn't exist until Baron Cuvier discovered the first mastodon.

No other bones like it existed, so he advocated extinction.

It wasn't long after that, by studying the interesting fossils left behind by higher life forms, that I was able to figure out how many species of plants and animals there were in the fossil record.

In the complex fossil record, there was a time when so many life forms seemed to suddenly die out, what older geologists called a "mass extinction."

For many years it was thought to be the work of God, or long-term climate change. But that changed dramatically in 1980, when Walter Alvarez surveyed rock formations near Gubbio in an attempt to determine the age difference between white rocks containing Cretaceous life and pink rocks containing Tertiary fossils above.

And how long did it take to transition from one geological age to the next?

What they found was unexpected

They found a very thin clay layer at the boundary of the stratum, and that clay layer -- this very thin red layer -- contains iridium.

And it's not just iridium, it's also glassy spherules.

The white part on this slide is chalk. Chalk was deposited in warm waters.

The chalk itself was formed by plankton sinking from the surface of the ocean to the seafloor and then accumulating, so 90 percent of the sediment you see here is the remains of life, and there's a millimeter-wide layer of red and black rock.

Black rocks are sediments from when there was no plankton on the ocean floor.

Here's what happens when a meteorite hits, and here's the proof, the famous K-T meteorite.

It's 10 kilometers long and it hit the earth.

And as its imprint spread across the globe in this very thin layer, the dinosaurs suddenly died out, and so did these beautiful ammonites, this litceras, this ceraceras, and the rest of life.

There's no question that this is true. There were two Hollywood hits, and the theories that were put forward between 1980 and 2000 fundamentally changed the way we geologists think about cataclysms.

Before that, uniformitarianism was the prevailing theory, which is that what happened on Earth in the past is still in existence today to explain it.

But we didn't witness a meteorite impact, so this is sort of the new extinction theory, and it took the scientific community 20 years to accept the meteorite impact theory -- that the mass extinction was caused by a meteorite impact.

In the last 500 million years, there have been five major mass extinctions known as the Big Five.

The first of the five major extinctions was 450 million years ago, the last was K-T, denoted by 4, and the largest was the Permian extinction, denoted by P, which is sometimes called the progenitor of all mass extinctions.

And each extinction was attributed to a large meteorite impact.

But is it true?

The reason why the Permian extinction was caused by a meteorite impact is the beautiful structure on the right.

Buckminsterfullerene C60 structure

It's called a buckyball because it resembles the infamous geodesic dome that was famous in the '60s.

250 million years ago, at the end of the Permian period, when a meteorite fell to the ground, the pressure caused

Buckyballs are formed and their ingredients are rare on Earth but abundant in space.

Because it contains helium-3, it became the basis for the meteorite impact theory.

But is it true?

In 1990, having already studied the K-T extinction for ten years, I moved to South Africa and continued my work twice a year in the Karoo Desert.

I've been lucky enough to experience that South Africa becoming the new South Africa every year.

And we camped near the Boer cemetery and stayed for months at a time to study the Permian extinction.

Fossils were rare

looking at distant ancestors

Fossils are mammal-like reptiles

It's an obscure animal that doesn't appear in movies.

This is called Gorgonops or Gorgon.

The skull of this animal is 45 centimeters. It was probably two to two and a half meters long.

The strongest carnivorous species Tyrannosaurus class

there are more things

my poor son patrick

(Laughter) Paleontological child bullying.

Stay still, because it's a substitute for dimensions

(Laughter) There were giant creatures back then.

55 mammal-like reptiles identified

The era of mammals began 250 million years ago for a short time

A big change has happened

Next came the Age of Dinosaurs

Everything was wrong, something happened that shouldn't have happened

But luckily -- this is a thrinaxodon, the size of a robin's egg, which I discovered just before I took this picture. It's very small compared to the pen.

You can see the eye sockets and the small teeth on the tip of the snout.

If this thing didn't exist, I wouldn't be speaking here.

So if this thing didn't exist, we wouldn't exist. There would be no mammals.

So who survived and who didn't, are there any patterns?

That's the result of my ten years of research.

There are many things, the red line is the mass extinction.

Some survived and survived, and it turns out that those who survived are rather cold-blooded.

Warm-blooded animals were almost culled during this time.

Survivors who survived formed a world surrounded by alligator-like creatures.

Dinosaurs hadn't appeared yet, just slow-moving, lizard-like, ugly creatures with scales surrounding the wetlands, with a few mammals lurking around.

There, mammals hid for 160 million years, and were released by the K-T meteorite.

Is there any explanation other than the collision theory? I have

Every time the Earth goes back to a microbial age like Precambrian, I wonder if there's been a mass extinction, and the microbes still exist.

microbes hate animals

I want to revive the microbial world.

I have tried many times to recover

So the mass extinction caused by life is inherently anti-Gaian.

Gaia's idea that life forms work to make the world a better place -- does anyone who drove down the highway in Los Angeles on Friday afternoon believe in the Gaia theory? not here

So I think there's an alternative. Life forms can actually destroy each other, they do so unconsciously.

This is what we believe to be a weapon that has been in use for 500 million years.

Some microbes metabolize hydrogen sulfide, and in large quantities.

Hydrogen sulfide is deadly to us humans.

As little as 200ppm can lead to death

If you go to the Black Sea and a few other lakes, you can see the purple color of the water.

It's purple because there are many microbes that feed on sunlight and hydrogen sulfide, and you can see it today, you can actually see it, and in the past, those microbes were there.

We can confirm that there have been revolutionary advances in the last three years in a whole new field.

I'm an endangered species I'm a fossil collecting paleontologist

But new breeds of paleontologists, like my graduate students, collect biomarkers.

They collect sedimentary rocks and extract oily substances directly from them, and then they can produce compounds that are characteristic of specific microbial communities.

Lipids are so strong that they're preserved in sedimentary rocks for millions of years, and after they've been extracted, you can tell who's been there.

And so we were able to identify, at the end of the Permian period, at many of the mass extinction frontiers, what we found is Isoleniera Latin, which is very unique.

It can only be found in conditions where there is no oxygen on the sea surface and the hydrogen sulfide is saturated enough to vaporize out of solution.

Based on this, Lee Kamp and my group at Pennsylvania State University came up with what we call the Kamp hypothesis, and that many of the mass extinctions were caused by high carbon dioxide depletion and hydrogen sulfide release from the oceans as a worst-case consequence of global warming.

where is this evidence?

The clue for this particular case is always flood basalt.

This is what the Earth looks like now, stripped of most of it.

It looks like a hydrogen bomb, but the effect is actually much worse.

This happens when material deep inside the Earth reaches the surface and spreads over the surface.

The lava flow isn't the direct cause of death, it's the carbon dioxide released with it.

This is a volcano, not a Volvo

But carbon dioxide is carbon dioxide

And then there's the data that Rob Varner at Yale and I have collected, and based on that, we've used a variety of methods to get a sense of how much carbon dioxide is in the entire rock record, and then to analyze the red line context of what I call a global warming mass extinction.

We found two very clear facts: these extinctions occurred during periods of rising carbon dioxide.

And the second thing, which isn't here, is that there was no ice on Earth when carbon dioxide was above 1,000 parts per million.

Currently rising at 380ppm

We'll reach 1,000 ppm in the next three centuries, but my Seattle friend David Battisti says 100 years.

Eventually all the ice will melt, and sea levels will rise 70 meters.

My house is on a hill, but soon it will be on the coast.

So what's the end result? The ocean will probably turn purple.

We think this is why higher life took so long to develop.

For a very long time, the oceans were filled with hydrogen sulfide.

That's why advanced life didn't exist.

Hydrogen sulfide continues to erupt in several places around the world today.

This is a picture of me taken two months ago with my favorite animal, the nautilus, so I wanted to show you.

This animal has been around for 500 million years

I'm doing some follow-up research. If you want to be part of the best project for scuba divers, this is it. It's near the Great Barrier Reef.

And at this very moment, the Nautilus tells us of their trajectory.

But sometimes there are dangers for divers, so let's think for a moment.

It's a bull shark that ripped off a device

I just caught it. There are sharks even at night.

Suppose I had my leg bitten off while swimming.

I'm 120 kilometers from the coast What will happen to me?

will die

Five years from now, I expect this to happen: you'll be pulled up on a ship, put on a gas mask, and you'll inhale 80 parts per million of hydrogen sulfide.

They are then placed in ice water, and with a 15-degree drop in body temperature, they are taken to an emergency room.

The reason this is possible is that we mammals have experienced so many releases of hydrogen sulfide that our bodies are adapted.

If realized, it would be a major medical innovation.

I'm Mark Ross of the Defense Advanced Research Projects Agency (DARPA).

I'm conducting research to save American soldiers wounded on the battlefield by request.

exsanguinate pigs

We administer 80 parts per million of hydrogen sulfide, the same conditions that survived past mass extinctions, transforming mammals into reptiles.

“I believe that this reaction is the result of repeated contact with hydrogen sulfide in mammals and reptiles.”

I got this email two years ago, and he said, "I think I've answered some of your questions."

He's now experimenting with rats, and experiments last four, sometimes six hours, and here's the latest data I got while traveling here.

The top line is the normal rat body temperature during the experiment, the dotted line is the room temperature during the experiment.

Room temperature starts to drop gradually from 25°C Room temperature starts to drop gradually from 25°C

And after 6 hours it rises and returns

Now, give the same rat 80 parts per million of hydrogen sulfide, and that's the solid line on the graph.

body temperature drops

It goes down from 35 degrees to 15 degrees, and then recovers normally.

This is how people are transported to critical care facilities.

This way, you can maintain a low body temperature and still be transported to an emergency room.

I'm sure you're all wondering, is my brain tissue okay?

it will be a big problem to overcome

If you're in an accident, you have two options: you can die, or you can inhale hydrogen sulfide and have, say, a 75 percent chance of mentally surviving.

what would you do

Do you carry around a little badge of intent to die?

The time is coming, it's going to be truly revolutionary.

It saves lives, but it comes at a cost.

The new discovery of mass extinctions is certainly a collision, and one that requires a long-term perspective, and there will be more collisions in the future.

but we are in greater danger

You could easily fall back into the world of hydrogen sulfide.

Thousands of years from now -- and thousands of thousands more -- will it repeat itself again?

How many people flew to get here?

How many of us have used up our Kyoto Protocol allowances just by flying this year?

How many have passed? I definitely passed

We as a species face huge problems

you have to win it

i want to go back to this reef thank you

(Applause) I just have one question.

Are you saying that we have a biochemical response to hydrogen sulfide embedded in our bodies that is evidence that past mass extinctions are caused by climate change?

Yes, our cells have the ability to release trace amounts of hydrogen sulfide in the face of crisis.

Ross discovered

So what I'm researching now is, can we find the traces of that?

Are there traces of it in bones or plants?

We're looking further into the fossils to see how many times such events have happened in the past.

It's an incredible medical technology, but it's also terrifying...

Gospel and curse

It was the spring of 2011, and I was preparing to go out into the world, as they say at college graduation.

Around that time, I graduated from university and moved to Paris for a job.

I dreamed of becoming a war correspondent, but the real world put me on a completely different battlefield.

At 22, I was diagnosed with leukemia.

My parents and I were told by doctors that my long-term survival rate was 35 percent.

I didn't understand what this diagnosis meant.

I knew that the reality and life I envisioned had been shattered.

Suddenly I had no job, no home, no way to support myself, and became Patient 5624.

For the next four years, chemotherapy, clinical trials, bone marrow transplants, etc. The hospital became my home, and I was in bed 24/7.

With no signs of recovery, I had to accept the new reality.

and adapted to my environment

I became familiar with medical terminology, made friends with other young cancer patients, collected fluorescent wigs, and learned to use a rolling IV stand like a skateboard.

Contrary to what I imagined, I also fulfilled my dream of becoming a war correspondent.

When I started blogging from the front lines of hospital life, I ended up writing a column for the New York Times called "Life, Interrupted."

But (Applause) Thank you.

(Applause) But most of all, I was trying to live.

(Laughter) I survived.

(Applause) Thanks to the support of so many people, not only am I still alive, but I've beaten cancer.

(Applause) Thank you.

(Applause) A traumatic experience like this changes the way people treat you.

I will tell you that I received a lot of inspiration from you.

"You are a warrior

A hero, one who has relived the journey of the legendary hero—one who has endured tremendous trials, survived all odds and has survived to tell the story, one who has become better and braver because of it."

i've been through that too

cancer changed my life

When I left the hospital, I realized who I was and what I was supposed to do in this world.

Now every day as the sun rises, I drink a big glass of celery juice and then do yoga for 90 minutes.

Then write 50 things you're grateful for on a piece of paper, and fold the paper into paper cranes and fly them out the window.

(laughs) Are you serious?

(Laughter) I've never done anything like this.

(Laughter) I hate yoga, and I don't know how to fold paper cranes.

To tell you the truth, it was after the cancer was cured that it was hard.

The heroic tales of disease survivors in movies and on Instagram are fictional.

Not only is it untrue, it's dangerous because it masks the difficulties of recovery.

Don't get me wrong, I'm very grateful to be alive, and I see fighting illness as a treasure that many people don't experience.

But it's important to share how the expectation of being a hero and being constantly grateful affects people who are struggling with illness.

Because when things get better, the recovery process isn't over.

rather it is the beginning

I will never forget the day I was finally discharged from the hospital.

After four years of chemotherapy, my long-term relationship with my boyfriend had cracked, and he had just walked out.

It was quiet when I entered the apartment.

disgustingly

At this point, I wanted to call my friend Melissa, who understands everything about me.

She was a fellow cancer patient, but she died three weeks ago.

I wanted to cry when I stood on the doorstep of my apartment.

i was too tired to cry

I had no adrenaline

Everything that had been tense since my cancer diagnosis seemed to suddenly collapse.

During the 1,500 days I've been battling the disease, I've been working towards a single goal: to live.

Now that I've reached that goal, I realize that I don't know how to live.

Of course, according to my medical record, I was recovering, and once my leukemia was cured and my blood counts were back to normal, my disability benefits were quickly stopped.

In the outside world, I'm clearly not sick.

In fact, I was far from being healthy.

The chemotherapy caused permanent damage to my body.

I thought to myself, "What kind of work can I do? I need four hours of naps during the day.

I'm regularly rushed to the emergency room because my immune system doesn't work."

There were invisible scars left by the disease, such as fear of recurrence, unhealed grief, symptoms of post-traumatic stress disorder (PTSD) that lasted for days, sometimes weeks.

In situations of war and imprisonment, we talk about reintegration.

I don't talk about other traumatic experiences, like illness.

I thought it was my fault because no one told me how hard it would be to reintegrate into society.

I felt so small, and in the midst of a terrible sense of guilt, I kept telling myself, "I'm happy just to be alive," because so many people died, like my friend Melissa.

But most of the time when I woke up in the morning, I felt so sad and lost that I could hardly breathe.

Sometimes I even wanted it to recur

Even so, if you're in your 20s and have just become single, you should be able to imagine a lot more wonderful things.

(Laughter) But I missed being in the hospital.

People in the hospital were just like me, and they were all in poor health.

But when I got out of the hospital and was among healthy people, I felt like a fake, and I was mentally drained and dysfunctional.

I miss the feeling of being able to clearly see my surroundings when I was in my worst physical condition.

When you face your own death, it simplifies your perspective and allows you to focus on what really matters.

When I was sick, I thought that if I survived, there was a reason.

To live a good life, an adventurous life, a meaningful life

But when I healed, I started thinking about how I was going to live.

I was 27 at the time, no job, no partner, no life plan.

Also, at this time, I didn't have a treatment plan or a discharge order to guide me forward.

Meanwhile, my email inbox was flooded with emails from people I didn't know.

Over the years, people around the world who read my columns sent me letters, comments, emails.

As is often the case with journalists, the content is wide-ranging.

There was a lot of one-sided advice, such as how to treat cancer using essential oils.

Some people asked me what my bra size was.

And yet (Laughter), mostly from people who understood my struggle with a different perspective.

A Florida teenage girl who had just finished chemotherapy like me sent me an email full of emojis.

A retired art history professor named Howard, who lives in Ohio, also sent me this letter. I've struggled with unexplained and deteriorating health conditions for most of my life.

Also from Little GQ, a Texas death row inmate. GQ is an acronym for Gangster Quinn.

his life was healthy

He does 1,000 push-ups every morning.

It resonated with my "hospital life" and "confinement" in a cramped prison with fluorescent lights that I wrote about in my column.

I wrote, "We're in different situations, but we're both threatened with death."

During those first lonely weeks and months of recovery, I relied on the words of strangers. Many people with different backgrounds and experiences all said the same thing.

i thought i needed some change

I wanted to take action again, to find a way to free myself from the pressure and return to the world I came from.

So I decided to go on a real journey, not a "journey called cancer" crap, not the legendary heroic journey that everyone expected me to be, but to pack my bags and go on a real journey.

I put all my belongings in storage, rented an apartment, rented a car, and set out on a trip with my best friend, who is very close but smells a bit stinky.

(Laughter) My dog ​​Oscar and I went on a 24,000-kilometer road trip around the United States.

During the trip, I went to see a correspondent whose face I didn't even know

I wanted your advice, and I wanted to say thank you.

I went to Ohio to visit retired professor Howard.

When we lose something, when we experience trauma, we feel the urge to protect our hearts.

Howard encouraged me to unleash myself into the unknown world of possible new love and heartbreak.

Howard's disease has no cure

When I was younger, I didn't know how long I had to live.

never got in the way of marriage

He now has a grandson and his wife and he attend ballroom dancing classes every week.

When I visited, they had just celebrated their golden wedding anniversary.

In Howard's letter, he wrote, "The meaning of life is not found in the physical world, not in dinners, jazz, cocktails, or conversations.

It strips everything away and there is meaning in what remains.”

I went to Texas to visit Little GQ, an inmate on death row.

He asked me how I was doing during my long hospital stay.

When I told him that I had gotten really good at Scrabble, I said, "So do I," and he explained. He spends most of his day in solitary confinement, where he and other inmates in neighboring cells build paper game boards and exchange answers from food ration slots.

And my final stop was Florida, to meet a teenage girl who had sent me an email full of emojis.

She was the perfect name for her because she was the brightest, most curious girl I've ever met.

I asked her what she wanted to do in the future, and she said, "I want to go to college, travel, eat octopuses and things I've never eaten, meet you in New York, go camping, but I'm afraid of bugs, but I really want to go camping."

I admired her for her optimism and firm planning for the future, no matter how hard she went through.

As Unique taught us, hope is far more radical and dangerous than fear.

The most important thing I learned on this trip is that there is no "boundary" between sickness and health.

the border is full of holes

We live longer and longer, recovering from illnesses and injuries that would have killed our grandparents, or even our parents.

this is the condition of our existence

I wish I could say that I came back from this trip completely healed.

it didn't work

But once I let go of the desire to be who I was before I was sick and learned to accept my body and its limitations, I started to feel better.

And in the end, I think that's where the secret lies: to stop thinking of your health as being polar opposites, sick or healthy or good or bad or perfect or bad, stop thinking that there's a perfect state of health to aim for, and stop living dissatisfied until you're healthy.

Everyone's life is interrupted, whether it's a diagnosis, a crushing heartbreak, or a trauma.

We have to find a way to live in the middle ground and manage our current state of mind and body.

Sometimes all it takes is the creativity to handcraft Scrabble, the love of family, the stripped-back meaning of a night ballroom dance, that radical and dangerous hope that one day will take a bug-scare teen to camp.

If you can do that, you've embarked on a true hero's journey.

I've reached a state of true physical and mental health, and I can say that I'm 'alive' in the way that I should be, the way I should be, the way I should be.

thank you

(Applause) Thank you.

(applause)

I'm not very tech-savvy, so I overheard my daughter, now 41, when she was five, saying to a friend, "Dad can't tell if you cut it and it doesn't bleed."

(Laughter) So the challenge I've been given may be insurmountable, and I'm going to try.

What the hell have I heard in the last four days?

This is my third time at TED.

One was TEDMED, and the other, you know, was a regular TED two years ago.

What I heard this time was wonderful -- something that had been barely covered in the last two TEDs -- a sense of social responsibility that was intertwined, woven and intermingled in so many talks -- international responsibility that appealed to enlightened self-interest, but was so much more.

Perhaps one of the things that struck me the most about what the 10 or so speakers came up with was the realization that if you listen carefully, they're not saying you should do this, you want them to do this --

They say they've done it because it's exciting, it's great, it's something they're going to get, and of course, it's also because they've done great things.

This is an ancient, very Greek idea of ​​philanthropy in its truest sense, philanthropy, or humanity.

The only explanation I can give you for what you've been hearing for the last four days is that it's due to a kind of affection.

this gives me great hope

Hope, of course, is the topic I should be talking about, but I completely forgot about it until I got here.

When I arrived, I thought maybe I should look this word up in the dictionary.

So my wife, Sarah, and I went to the Public Library, which is four blocks away, on Pacific Street. I looked it up in the Oxford English Dictionary, and there were 14 definitions of "hope," but none of them felt right.

And it should be, because "hope" is an abstract phenomenon or concept, not a concrete word.

This reminds me a little of surgery.

It turns out that one surgery for one disease works.

You would think that if you had 15 surgeries, none of them would work.

This also applies to the definition of words

If you have appendicitis, removing the appendix will cure it.

If it's reflux esophagitis, there are 15 treatments, and Joe Schmoe treats them one way, and Will Blow treats them another way, and they all fail, and so does the word "hope."

It's all about the expectation that something good should happen.

let me tell you my findings

The Indo-European word for "hope" comes from the root "K-E-U," which is spelled "K-E-U" and pronounced "koi," which is the same root as "curve."

But in the original Indo-European language, it means to change direction, to go a different way.

I found this to be really interesting and provocative, because what I've heard over the last few days is the sense that it's going in a different direction, a direction that's specific to each problem, a unique direction.

there will be different paradigms

I'm sure you've heard this a few times in the last four days, and I'm sure you're all familiar with the idea of ​​Kuhn's paradigm.

So when we think about hope, we have to look in a different direction.

It's not a definition, but it has a striking description of hope, written by Václav Havel, in his wonderful book, What Disrupts the Peace, where he says that hope is not the expectation that things will turn out the way you want them to, but the expectation that whatever the outcome will mean something.

A few days ago, Dean Kamen gave a great presentation, and the final words gave me a huge sense of relief.

I wasn't sure if I heard correctly, so I searched for him in the intersession.

He was talking to a well-built man, and he interrupted.

When asked, "Did you say this?"

"Yes" was the answer

repeat it here now

"The Internet cannot save the world"

What do you think will save the world?

it is the human spirit

But the human mind isn't divine or supernatural, and skeptics like me wouldn't say that.

What I'm talking about is the ability that we all have to try to be better than ourselves, to rise above who we are and to do things that we initially thought were impossible.

On a basic level, we've all felt that spirit when our children were born.

Some of you may have felt it in the lab or on the workbench.

I feel it even in concerts

I felt it in the operating room and by the bed.

It's a feeling that transcends and lifts us up.

I think it will eventually become an element of the human psyche that I've been slowly hearing from many speakers over the past few days.

If there's something going on in this room, it's exactly that.

I'm interested in a concept that originated in the early 19th century -- actually in the 1810s -- by 27-year-old poet Percy Shelley.

In modern times, Shelley is known as the great Romantic poet, but many of us tend to forget that he also wrote wonderful prose.

It's five, six, seven, maybe eight pages, and after the third page it gets kind of deep and esoteric, but at some point on the second page, he starts talking about a concept he calls "moral imagination."

This is a rough interpretation of it, but here's what it says: Human beings -- ordinary people -- in order to be very good, a human must have a clear vision.

you have to see yourself and the world through someone else's and many others' eyes

See yourself and the world - not only the world, but yourself

What is expected of us by hundreds of millions of people -- people who live in what Laurie Garrett so aptly described the other day as "despair and inequality"?

What could they ask of us?

What can we ask of ourselves based on humanity and the human spirit?

you all know

There's been a lot of debate about whether America, as a superpower, should be the world's police force, the world's security force, but we shouldn't be debating whether we should heal the world.

For the past four days, there has been no such discussion in this hall.

If we are to become a world healer, then all the world's disadvantaged people, including the people of America, are our patients.

Possibly all underprivileged nations, including this one, become our patients.

It's also interesting to consider the etymology of the word "patient."

Derived from the Latin "patior" meaning "to endure" or "to suffer"

What do we know when we go back to the roots of the old Indo-European languages? The stem is pronounced "payen" and spelled "P-A-E-N" -- which, surprisingly, is the same root for the word "compassion."

The lesson is clear: our patients, the world, and the world's underprivileged people, deserve our compassion.

But much more than compassion is the moral imagination and the ability to see each and every person in this world as an individual tree rather than as one big forest.

Of course, in times like these, it's hard to keep individual trees from being covered by Washington's bush.

(Laughter) Now we

We must morally strive to be the healer of the world.

We've seen many, many examples, including the one we're listening to right now in the last 15 minutes. People who not only have the determination to work hard, but also the charisma, the talent -- it's really easy to use the word "talent" in this room. People who have the talent to succeed, at least at the beginning of their quest, and who believe in their success as long as more and more people buy into their motives.

Now, since we're talking about medicine, about healing, there's someone I'd like to quote.

It's like everyone in the world has been quoted. Pogo has been quoted, Shakespeare has been quoted from all angles.

I would like to quote one of the well-known greats in my field.

I don't know if he really said that, because even Hippocrates doesn't really know, but I do know that one of the great Greek physicians said the following, recorded in a book attributed to Hippocrates, called The Guide.

I would like to read here

I want you to bear in mind that I'm really talking about philanthropy, the love between human beings -- human beings as individuals, and a human being can turn that love into action, and sometimes into enlightened selfishness.

That person said 2,400 years ago, "Where there is human love, there is the healing of love."

Today we recognized it, we felt it -- and for the last three days we've witnessed it with the indomitable human spirit.

thank you

(applause)

I happened to be an inventor.

I was discharged from the Air Force in 1956. No, I was enlisted in 1956 and discharged in 1959. After I was working at the University of Washington and reading a magazine article, the idea for a new gramophone tonearm came to me.

It was a time when there were no cassette tapes, CDs or DVDs that we all use today.

The tonearm I came up with is a linear tracking tonearm that moves straight instead of using a pivot axis as a fulcrum.

This was the most difficult invention I've ever made, but it's what got me started, and I've been lucky ever since.

With that out of the way, let's talk about the invention I brought with me today: my 44th invention. No, this is also true.

I'm terribly out of focus today.

44th patent, 15th invention.

I call this "hypersonic sound".

I'm going to ask you to actually listen to it in a little while, but before that, I'd like to compare this technology to something else.

It's amazing when you show people a "hypersonic sound", but what is it used for? Well asked.

On the contrary, I ask: What are light bulbs used for?

Sound and light I would like to compare these two.

It's been this way since Edison invented the light bulb.

Not much has changed.

Light is emitted in all directions.

Even before the light bulb was invented, people figured out how to use reflectors to focus light, and put lenses in front of them to focus light a little more efficiently.

Finally, it became possible to create a highly directional light like a laser.

Please think about it in today's world.If there was a light bulb that could not concentrate the direction of the light,If the light spreads in all directions when the electricity is turned on.

That's exactly what today's speakers do.

About 80 years after its invention, when you turn on a speaker, the sound spreads as you please.

Even if you're standing in front of a megaphone, you can hear the sound from anywhere.

There is some difference, but not much.

If a light bulb can't be focused like a speaker or have an edge, then you can't watch movies, computers, TVs, CDs, DVDs... If you think about it, you'll realize the importance of directing light.

After 80 years of making sounds, I thought it might be time to find a way to manipulate sounds.

Here are some pieces of equipment.

That guy over there, which I demoed yesterday, was made for a Detroit automaker - miniaturized for overhead mounting and binaural sound in the car.

What if you could direct sound to a specific location like light?

This is the sound of a waterfall recorded in my garden.

You won't hear anything until this is actually turned on.

If you hit a wall, it may bounce and spread across the room.

(Applause) Sounds are made right next to your ears. It is not great?

(Applause) Time is limited, so let's put this aside for now and talk about how this works and what it's good for.

Naturally, like the lights, the sounds complement the clothes racks, the corn flakes, the toothpaste, and the talking pops in the movie theater lobby.

Sony seems to have an idea, and now Sony is the best customer.

Actually, he tried it in the 1960s, but he was too smart, so he gave up.

But I want to use it... No, it's true

・・・

I'm kind of smart, and just because I haven't graduated from college doesn't mean I'm stupid, because in today's world, being stupid doesn't do much.

There are smart people out there. So

It seems that I was educated in an unusual way.

I am not against education at all.

I think it's a wonderful thing. Sometimes people lose something by studying. Too smart to look around.

It's a very blessed era now, and various things are being excavated again.

I have a little motto. It "actually scarcely boasts about anything yet - it hasn't been invented."

It's just the beginning.

Only recently have we begun to understand the laws of nature, science and physics.

I hope this invention helps.

Diverting a bit, Sony has another eye on this: you'll be able to watch TV while you're in line at the grocery store.

When watching TV at home, there are too many channels, so many people change the channel during commercials and don't watch commercials.

151 million people line up at supermarket checkouts every day.

I tried this a few years ago, but eventually the TV was turned off because the clerks couldn't stand the sound of TV commercials repeating every 20 minutes.

However, as you know, if there is no sound, the product will not sell.

For example, movies are shown for free on airplanes, but if you want to hear the sound, you have to pay.

So ABC and Sony are doing something new, when you're in line at the supermarket checkout -- which Safeway is experimenting with right now -- you can watch TV.

I wish I didn't have to increase the extra publicity and do something that bothers me.

The good thing about this invention that we know from our experiments so far is that if you don't want to hear the sound, you can take a step to the side and you won't be able to hear it.

As we make sound, we also make silence.

Only you can hear the voice of the ATM.

You can watch TV in bed at 2am. Even if your wife or someone else is sleeping next to you, they won't hear you and won't wake you up.

We are also working on noise cancellation for snoring and noise from cars.

I was lucky. The world needs this technology right now.

Demand is soaring.

We started selling it in September/October last year, and the results have been astonishing.

By the way, I won't sell it today, but if you're worried about the cost, the whole set of this unit is about 90,000 yen ($1,000).

This time next year, you can buy it for tens of thousands of yen.

There is no big difference in price compared to other electronic products.

I don't think you heard the heavy bass when I heard this earlier.

This unit is a speaker with a frequency band beyond the human audible range from 200Hz.

In fact, it vibrates about 100,000 times per second and emits ultrasonic waves.

And unlike ordinary speakers, the sound you hear is not created by the vibrating surface of the speaker, but is created in the air.

As we have been taught all along, air has non-linear properties.

Raise the volume a little, and the distortion of the sound transmitted through the air becomes noticeable when it slightly exceeds 80 decibels.

This is because the speed of sound in air is not constant. and quite late.

It changes with temperature and pressure.

Imagine this as a sine wave.

If the amplitude becomes too large, it will act on the pressure and change the propagation speed of the wave while this sine wave is being generated.

In the world of audio, linear characteristics are considered ideal.

The more linear, the higher the sound quality.

"Hypersonic Sound" is the exact opposite, it is made on the premise of non-linear characteristics.

Sound distorts in the air -- in this case, it's part of the emitted ultrasound -- but that distortion is easily predictable and can be used to create targeted sonic effects.

The next question is where is the sound made? is.

Instead of being made on the plane of the cone, sound is made by hundreds of millions of points in the air that stretch out like columns, and when you point it at your ear, sound is made right next to your ear.

You can shorten the distance that the sound reaches, or spread it over the entire sofa.

One ear can hear one speaker and the other ear can hear the other. This is true binaural sound.

When I listen to stereo at home, I hear both speakers with both ears.

You will notice that you can hear in your right ear even if you turn on only the left speaker.

This limits the sound field that unfolds in front of you.

Because sound is a column, it doesn't obey the inverse square law, which says that it falls off by two-thirds every time the distance doubles, say 6 dB from 1 meter to 2 meters.

With this, when you go to a rock concert or symphony, people in the front row and people in the back can hear the same sound pressure.

Sounds great, doesn't it?

We are very lucky to have a company that understands this vision, and I think we are doing quite well. Car makers have a front-seat stereo system for kids and another system in the back... Oh no, kids don't drive, right?

(Laughter) I was just testing to see if I was listening.

Actually, I haven't eaten breakfast.

Whether you have a stereo system for your parents in the front and a little DVD player or rap music in the back for the kids, they won't be distracted by it.

Therefore, it is becoming more and more common to say that the sound can be played at any desired position.

This also applies to data transmission and reception.

In fact, the performance is five times better in water.

The military has also introduced this to Iraq, placing fake military movements on hills hundreds of meters away.

(Laughter) Or whisper Bible verses to terrorists.

(Laughter) It's true. If you look at it with an infrared device that reads people's facial expressions, you can see a slight temperature change when playing this from 90 meters away.

I believe that there may be a way to use that to determine whether someone is an enemy or an ally.

I made a version of this that outputs 155 decibels.

Pain is 120.

With it, you can communicate from a distance of 1.6 kilometers (1 mile), and even if there is a beach right next to you, you won't notice it at all.

We are selling this for about 6 million yen ($70,000), but it sells at the pace of production.

It is mounted on the turret along with the camera, and even if it is targeted by the other party, it is the turret that is being targeted, and I am over there.

There are many other inventions.

I also invented something called a plasma antenna.

I was looking up at my office ceiling, and I was in the middle of a ground-penetrating radar project, and the physicist CEO came up to me and said, 'I have a problem.

We are using fairly short wavelengths.

Because of that, the chattering of the antenna is terrible. ♪

When using high frequencies, the antenna resonates like a tuning fork, and the energy emitted by the antenna itself exceeds the backscattering in the ground, making the analysis too heavy. ”

My answer was, "Why don't we make an antenna that exists only when it's needed?

Power on, power off.

It's like a fluorescent light. ”

I sold it for 130 million yen ($1.5 million), in cash.

After completing the patent application and being declassified, I took it to the Pentagon and when I introduced it, they laughed at me at first, but after the demo, they immediately bought it.

(Laughter) Has anyone used Jabra headphones, those little portable headphones?

That is also my invention. It sold for 600 million yen ($7 million).

Big mistake, it sold for 7 billion yen ($80 million) just two years ago.

I actually drew that on an old Mac I had in the attic of my house, and one of the designs I have now is exactly the same one I drew a long time ago.

Like I said, I'm pretty lucky as an inventor.

I think you are the happiest person you will ever meet.

My father passed away without knowing that someone in the family would achieve something.

Thank you for being a good audience. A lot of things have flown by.

I usually think about the content of the story when I'm standing in front of everyone.

Finally, in the remaining minute, I'd like to do another demo of this guy for those who haven't heard it yet.

I don't know when it will make a sound.

If you haven't listened yet, please raise your hand.

are you going there?

Also a cameraman.

It is like this.

Don't you like the sound of opening a cola can in your ear?

One last time, thank you.

Thank you for your attention.

The roar of the crowd, the roar of the lion, the clatter of metal

Since 80 AD, the Colosseum has been filled with sounds like these.

Hundreds of days a year, crowds of more than 50,000 people, both Roman citizens and members of the Roman Empire, filled the four-story bleachers to watch gladiator duels, battles with wild beasts, and chariot races.

In the finale of the event, the arena was flooded with water, submerging the arena, and the most spectacular spectacle began: a simulated naval battle.

Roman grand-scale simulated naval battles, called naumachia, began in the first century BC, during the reign of Julius Caesar, more than 100 years before the Colosseum was built.

Naumakia, along with other water shows, has been held in natural and man-made ponds around Rome, but Emperor Flavius ​​Vespasian began building the Colosseum on the site of the pond in AD 70.

The Colosseum was built as a symbol of Roman power in the ancient world, but there was no better display of power than a device that allowed water to drain and flow at the command of an emperor.

In 80 AD, Flavian Titus, son of Vespasian, used his booty to fulfill his father's dream, completing the Colosseum, known at the time as the Flavian Amphitheater.

The Colosseum's dedication was marked by 100 days of spectacle and gladiatorial matches, including parades, musical performances, public executions and gladiatorial matches that set a precedent for events to come.

Unlike games in small amphitheaters funded by wealthy Romans, the extravagant spectacle in the arena was sponsored by the emperor himself to demonstrate his authority.

Parades of exotic animals, theatrical performances and the majestic "naumakia" were all held to promote reverence for the godlike emperor, who was, in fact, deified after his death.

The mechanism of this water trap is shrouded in mystery to this day.

There is a theory that a large water supply was drawn to the arena,

Another theory is that the drainage system, consisting of cisterns and locks, was also used for water supply.

If you fill the cisterns with water before the event, and then open the floodgates when you submerge the stage, you'll have more than 4 million liters of water flowing in, to a depth of about 1.5 meters.

But in order to use so much water and not hit the floor of the Colosseum, we had to have a special small, flat-bottomed boat.

The ships ranged in length from 7 to 15 meters and were modeled after ships used in famous naval battles.

When the simulated naval battle began, dozens of ships floated in the arena with gladiators disguised as allies or foes in the battle.

The gladiators would duel on various ships, board enemy ships, fight, drown and incapacitate their opponents until only one team survived.

Fortunately, the water shows weren't all gruesome.

In some aquatic shows, chariots glide across a submerged stage and charioteers make waves like Triton, the sea god.

There were performances of animals walking on water and mythological reenactments by prisoners.At night, naked synchronized swimming was performed under a bonfire.

But the water show at the Colosseum didn't last long.

Simulated naval battles were so popular that Emperor Domitian designated a nearby lake as a simulated naval battlefield in the early 90s.

Naumakia turned out to be better suited to large naval battlefields, and then the Colosseum was equipped with underground animal cages and trapdoors to keep water out.

Yet, for a short period of time, the Flavian emperors did rule over war and the tides of the waters in a grand show of power.

I'm a space dynamics researcher, just like Rich Parnell from the movie "The Odyssey."

And my job is to study and predict the motion of objects in space.

Today, we're tracking about one percent of the dangerous objects in orbit that pose a threat to geolocation, agriculture, finance, broadcasting and communications, and soon, really soon, even the Internet.

At the moment, those services are open to an estimated 500,000 different objects, ranging in size from a small piece of paint to an object the size of a school bus.

A small piece of paint travels through space at a reasonable speed, and if it collides with another object, it can render that object useless.

But it can't track objects as small as a slick of paint.

If it's the size of a smartphone, tracking becomes possible.

Of the 500,000 objects we have to worry about, we can only track 26,000 of them.

Of those 26,000, only 2,000 are functional.

everything else is garbage

really a lot of trash

And to make things a little worse, most of the things we launch never come back.

We launch a satellite into orbit, and when it stops working or runs out of fuel, we launch another satellite.

and launch another satellite

and another thing

Or maybe two of them collide, or one of them explodes, or even worse, someone destroys the satellite in orbit, creating more debris, most of which will never return.

Such objects aren't just randomly scattered in orbit.

Considering the curvature of space-time determines where some satellites should be placed, think of them as highways in space.

Much like terrestrial highways, space highways have a cap on the amount of traffic they can carry in order to continue to operate safely in space.

Unlike highways on Earth, there are no traffic rules in space.

There really is nothing Can you believe it?

Oh

What does this mean?

(Laughter) So what I'd like to see is some kind of space traffic map, like Waze in space, where you can look at current traffic conditions in space, and maybe even make predictions.

But here's the problem. If you ask five different people, "What's going on in orbit? Where is the object going?"

and you'll get 10 different answers

why the hell

That's because information about objects in orbit isn't centrally shared.

So what if we had an open, transparent information system that could let us know the location of every object in the universe, accessible from all over the world? to keep the universe safe and sustainable.

And what if that system could be used to establish an evidence-based code of conduct for traffic rules in space?

So I developed ASTRIAGraph, the world's first crowd-sourced space traffic monitoring system, at the University of Texas at Austin.

ASTRIAGraph integrates industry, academia and government information from around the world and displays it in a common framework that is now accessible to everyone.

So 26,000 objects in orbit around the Earth are displayed like this, with the views of multiple agencies in near real time.

Let's go back to the problem of space traffic maps. What if we only have information from the US government?

In that case, the space traffic map would look like this.

But what about Russian opinion?

It looks completely different

who is right and who is wrong

What should I believe?

What can we trust?

this is one of the challenges

Without this framework for monitoring the behavior of space actors and activities in space -- for monitoring the location of such objects, bridging the gap and making that knowledge common sense, we risk losing our ability to harness space for the common good of mankind.

thank you

(applause and cheers)

Cheryl: Today with Amy-- Hi Amy. Amy Mullins: Hi

Cheryl: I thought I'd talk to Amy for a minute, can you tell me why Amy is getting so much attention as an athlete?

AMY: Well, if you've seen my biography photos, you might already know that I'm a double amputee and I was born without a fibula in either leg.

I had both legs amputated when I was a year old, but I've been running around all my life.

Cheryl: So, can you tell us how you got to Georgetown University?

Shall we start there?

Amy: I'm a senior in the foreign affairs program at Georgetown University.

When I was in high school, I got a full tuition scholarship for college.

Georgetown University selects three students from all over the United States every year to get them involved in international affairs, and I was one of them to go to Georgetown University.

Cheryl: When Amy started college, she got interested in track and field and decided to call someone to talk to her.

Can you tell me that story?

Amy: Right. Well, have you always liked sports?

I played softball for 5 years when I was a kid.

I used to ski competitively when I was in high school, but in college, I didn't play any sports for a year or two, so my body got a little worn out.

But I had never competed in a sport for the disabled, I was always competing with able-bodied athletes.

i didn't know that

In fact, I never met another double amputee until I was 17.

So when I heard there was going to be a track and field event for disabled people, I thought, "No, I don't know what that would be like."

So I booked a flight to Boston It was '95 and I was 19 I was definitely the dark horse in the competition I'd never been before

A few weeks before that, I went to a gravel track to see how far I could go.

My feet were wood and plastic prosthetics attached with velcro straps and I was wearing big, thick wool socks.

And in Boston, I was trying to compete with people with prosthetic legs with carbon-graphite shock absorbers and stuff, and I think they were looking at me and thinking, "Well, I can't beat that."

So what I was expecting -- I don't know what I was expecting -- at a competition, I saw a guy who was missing an entire leg, did the high jump on one leg, and jumped 183 cm.

Dan O'Brien jumped 156 centimeters at the 1996 Olympics in Atlanta.

So I decided to give it a try, but with a lot of trepidation, I entered the competition for the first time.In this first competition, I beat the national record holder by 0.03 seconds and became the new national record holder.

But I was told, "Amy has natural speed, but she doesn't have the skills or the tricks to run the track.

My running form was messed up

But I know you worked hard."

So I decided to call my track and field coach in Georgetown.

Thankfully, I didn't know how great the coach was.

He'd coached five Olympians, and his office was covered from floor to ceiling with all-American accolades from the athletes he coached.

And he was just a pretty scary person

So I called my coach and said, "Well, I competed once and won."

(laughs) "I have a question -- if possible, I'd like to watch your practice and see how you train."

That's it, I only wanted to see you practice twice

So I asked, "Can I take a tour?"

Then he said, "Well, let's meet first before we decide."

I think the coach was thinking, 'What the hell is this?

So I met the coach, and when I walked into his office, there were a lot of posters and magazine covers with the athletes he coached.

And we had a long talk, and we ended up with a great partnership. The coach had never coached a disabled athlete, so he had no preconceived notions about my abilities, because I had never been coached.

"Let's get started!"

After that, my coach would make time for me during lunch breaks four days a week and we would practice together at the track.

That was how I met Frank.

It was the fall of '95, and as winter came around Frank said, 'I'm good enough now.

I can make it in the women's track and field club here."

"No, you can't do that," I said

Frank said, "No, really, you can do it.

You can run with our women's team."

Then, in May 1996, I joined the Georgetown Women's Track and Field Team with the goal of becoming a member of the U.S. Paralympics team.

No disabled person has ever run at the college level

So it kind of turned into an interesting mix.

Cheryl: I'd love to hear about your story on the way to the Olympics, but there's something you'll never forget about Georgetown, right?

Can you tell me that story?

Amy: Well, I ended up winning all the disabled competitions I competed in. But I was practicing in Georgetown and I thought I had to get used to running with other people's backs 'cause I was competing with this kind of Joyner's Egg

And I put on the Georgetown jersey and practiced with everyone, and I thought, to get better -- well, I was already number one in the nation -- I had to train with guys who were inherently stronger than me.

And I got into the Big East league, kind of like an end-of-season championship.

very, very hot

And it was around that time that I got a new short-distance prosthesis, just like in my bio.

Then, at the 85m point of the 100m run in public, I fell off my prosthetic leg.

Or rather, in front of 5,000 people who were about to fall down

I was so embarrassed I felt like dying.I was supposed to run the 200 meters in 30 minutes.

(Laughter) And I said to my coach, "Please, let me withdraw!

I can't do it in front of everyone, my leg will definitely fall out

If you pass at the 85m point, it is absolutely impossible to reach 200m. ”

So the coach sits like this

Thankfully I didn't listen

Well, she's from Brooklyn, so she's a big deal... and in her Brooklyn accent, she said, "Amy, it doesn't matter if your legs come off, right?

Just pick it up, put it on and finish the race! ' said

(Applause) So I did. That's how I got over my fear

Thanks to my coach, I didn't lose my way

Cheryl: Then Amy became a Paralympian in 1996. She was so excited that her family came to visit and it was a big deal.

So it's been two years since Amy started running?

Amy: One year

Cheryl: 1 year. So, can you tell us a story about what happened before you went to the Olympics?

Amy: Yes. I'm talking about Atlanta

Just to clarify, the Paralympics are for people with physical disabilities, such as amputees, cerebral palsy, and wheelchair athletes, not the Special Olympics for the mentally ill.

So a week after the Olympics, I was in Atlanta, and a year ago I couldn't run 50 meters on a gravel track, so I was already overwhelmed.

But on the other hand, I haven't lost yet

That May, at the Olympic qualifiers, I had set several new records, and I believed I was going home with a gold medal.

Also, there is no one other than me who has a so-called "bilateral BK" below the knee.

I was the only girl who did the long jump

And after I finished the long jump, this guy with no legs came up to me and said, "How are you doing?

I said, "But I just flew. I've never heard of that."

In the end, I was 8 centimeters short of the world record, but it was weird, so I was able to keep trying. Then I signed up for the long jump.

No, I didn't apply, I qualified for the long jump and the 100m race.

I still remember

My face was in the local newspaper that I delivered for six years.

It felt like my time had come

Anyway, I was warming up in the stadium track, which is a few blocks from the Olympic stadium.

The prosthesis I used... I'm giving it out now I was the first to use a prosthesis like this

'Cause I was kind of a test bed, you know, I was kind of a tourist attraction

Everyone was taking pictures of me thinking, "Why is this girl running?"

I always wondered, "Where's the competition?"

This was my first international convention

Trying to extract useful information from someone, I asked, "Who are you going to run with this time?"

Just say, "Hey, who are you? I'll tell you when I find out"

I also wanted to know the race times...

All I said was "No, don't worry! You'll be fine!"

That was 20 minutes before the competition at the Olympic Stadium.

My personal best time for the world record was 15.77 seconds.

The person in lane 2 next to me had a time of 12.8 seconds.

Lane 3 was 12.5 seconds, Lane 4 was 12.2 "Huh, what is this?"

Then I got on the shuttle bus with other players, and they all had one hand missing.

(laughter) I'm already like this... Everyone was looking at me like, "This person is somehow different."

And on the bus, I thought, "Eh! What should I do? What should I do?"

I've never lost anything...scholarships, and when I skied, I won five gold medals...I was always number one.

And Georgetown was great too.

I always lost, but it was the best practice for going to Atlanta.

But now, being with a top-notch player, I thought I would definitely lose.

And I just kept worrying and thinking, "Oh my God, my whole family came all the way from Pennsylvania in the van."

Also, I was the only female sprinter in America.

Anyway, everyone's name was called and they said, "Everyone, one minute left."

I was really nervous, but when I was assembling the starting platform, the audience started to get noisy, especially the people near the starting line could see me well...

I'm like, "Yeah, look, it's kind of weird."

Well, then I thought, "I already know I'm going to lose, so let's mess things up."

(Laughs) It's like Rocky 4. Me vs Germany. and all other players. There are people from Estonia and Poland

Then the guns rang out to signal the start I only remember finishing in last place Holding back tears of frustration I just felt overwhelmed

"What are you here for?

What was the point of coming here when you already have the world record? I couldn't help but think

Keep training and change your life

became a college athlete and an Olympian

I thought about what it was like to get to that point.

In particular, it was only a year and three months ago that I decided to become an Olympian.

For my dream, how many people have helped me?

Many people have been patient with me and have spared their precious time to share their expertise and work with me.

"Common Glory" -- 50 people who cheered me on an amazing adventure with me to go to Atlanta.

This kind of thinking drives everything I do. When I think about my progress, like how close I am to my goals today.

Of course, it's important to have goals, but it's also important to know the process of achieving them.

I think that's really the most important thing

Cheryl: Can you show us your legs?

Amy: Oh yeah

Cheryl: Can you show me some legs?

Amy: So here are my nice legs

(Laughter) No, it's actually a cosmetic leg. It's very beautiful.

you'd better keep an eye on it

It even has pores. You can even put nail polish on your toenails

No kidding, you can wear heels

I don't think many people realize it, but it's amazing to be able to go to a shoe store and buy anything.

Cheryl: Can you decide your own height?

Amy: Yes, that's right

(Laughter) Patrick Ewing, a basketball player from Georgetown in the '80s who visits his alma mater, Georgetown University, every summer.

The last time I came here, Patrick had an injured leg and I was teasing him the whole time.

"You can take it off! Don't worry!

You can even be 243 cm tall. "

(Laughter) I thought it was funny, but it didn't really hit Patrick.

So, these are the legs for sprinting. Like I said, they're made out of carbon-graphite, so when you put those legs on, you have to put them in the right sockets.

Oh, I have too many legs

This one...can you take this for me?

So this leg is for tennis and softball

It has a shock absorber, and when it flies around, it makes a funny "whoosh" sound.

So, in order to wear these legs, I wear this silicone cover, but when I sweat, it moves like a piston.

Cheryl: Will your height change?

Amy: With this?

Cheryl: Now

Amy: I don't know. I don't think so

Well, it might stretch a little. Should I wear it on both legs?

Cheryl: With these legs, it's hard to stand without moving.

Amy: Right. You have to move. It takes a little skill to keep your balance.

Hey, I'll try wearing it without using the silicone cover.

I will run with this. I surprised half the world with this

(Applause) When you run with it, you can replicate the actual running form of a sprinter.

When a sprinter watches his run, he sees that only his big toe touches the ground.

When you stand on these legs, your hamstrings and glutes contract, just like those sprinters' legs.

Audience: Who made it? It's a San Diego company called Flexfoot.

I was a test subject, and I will continue to do so. For all new prostheses

But like I said, here's a prototype

But I have to buy a new one. At the council meeting the other day, we were talking about...

Moderator: Amy and the prosthetic leg designer are going to talk about designing prosthetic legs at TED Med 2.

Amy: yes yes

Cheryl: good

Amy: And these are sprint legs. after that

Cheryl: Can you tell us about other leg designers?

yes. It was made in a place called Bournemouth, about two hours south of London, and I'm the only person in the US who has it. disappointing

Not only because my toes are beautiful...

I'm a very serious athlete on the field, but outside of competition, I want to look feminine. I think it's important not to be confined to one field, whether it's your sphere of activity or fashion.

I love that I can freely choose the shoes and skirts I want wherever I go, so I want to bring these legs to America so that many people can use them.

This one is also silicon.

Beneath this is a very basic prosthetic leg

looks like a barbie doll leg

(laughs) It's true. I can't move from here, so I have to wear five centimeter heels

Besides... I'll take it off for you all to see

i don't know how much i can see

You've got veins on your feet, your heels are pink, and your Achilles tendon moves a little.

It's really great. I got it made a year and two weeks ago

And this is just silicone skin

Two years ago, a man in Belgium thought to himself, "At Madame Tussauds, we can make a doll that looks exactly like Jerry Hall, down to the color of his eyes, and looks like he's about to breathe. Couldn't we make legs, arms, and hands for amputees?"

Now you can even make ears out of silicone for burn victims

You can really do anything with silicon

Cheryl: Two weeks ago, Amy was on her way to the Arthur Ashe Awards ceremony at the ESPY Awards.

Amy arrived in town and hurriedly said, "I need to buy new shoes!"

It was an hour before the ESPY Awards presentation.

Amy: It must be difficult to walk in it all the way through the awards ceremony.

Cheryl: 45 minutes -- luckily the people at the hotel were great.

Found someone to cut off my shoes

(Laughter) Amy: I went to the front desk with Cheryl and said impatiently, "Hey, I'm having trouble with my shoes.

Can someone please help me? At first they seemed to ignore me... I was like, "I'm sorry you didn't like the shoes..."

"No, no, my feet aren't normal. They should be 5cm heels, but these are 8cm."

I want you to have just a little bit of it."

they seemed horrible to think

But in the end he did

So these legs are really nice

I'm planning to have this leg modified in half a month.

I can't wear sneakers with these legs, so I want legs like this for flat feet

So... Moderator: That's all.

Cheryl: It was Amy Mullins.

(applause)

Asking for help is the worst, right?

It doesn't rank alongside speeches and death in the list of scariest things, but it wouldn't surprise me.

It's silly to be afraid to admit you need help. Whether it's a lover, a friend, a colleague, or even a stranger, there's something embarrassing and embarrassing about asking for help, which is why so many people try to avoid it as much as possible.

My dad was one of those people who would rather walk through a crocodile-infested swamp than call someone to help him get back on the road.

as a child on a family vacation trip

When I drove from my home in southern New Jersey to Colonial Williamsburg

I remember getting completely lost

My mom and I said let's stop and ask someone how to get back on the highway, but my dad didn't listen at all, he said, he didn't get lost, he'd always wanted to see this place.

(Laughter) If you ask people for help -- we all need help every day, and the only way to make asking for help less painful is to get better at it and increase your chances of getting a yes answer when you ask for help.

Not only that, but it's also important to make them feel that helping themselves is a satisfying and rewarding experience, and to make them feel like they're going to help themselves in the future.

In a study I did with a colleague, I started to understand why people tend to give up or decline when they ask for help.

First of all, I would like to say that when you need help, you have to say it clearly.

we are more or less

We suffer from what psychologists call the illusion of transparency, the belief that our thoughts, feelings and needs should be obvious to others.

This is wrong, but we all feel that way.

So we wait patiently for someone to recognize our need and offer to help.

this is a very bad assumption

In reality, it's hard to know what someone needs, and even those closest to you have a hard time knowing how to help.

My husband now has a habit of asking multiple times a day, "Are you okay? Do you need anything?"

I'm not very good at telling people I need help.

My husband is so patient that I don't care about him, and he's very willing to help people.

When you need help, you have to ask

You know you need help, but how do you know if you want help?

Have you ever offered help that someone didn't ask for, only to find out that the other person didn't want it?

It's very embarrassing, isn't it?

It's a true story, and I gave my teenage daughter some unsolicited advice about what to wear to school.

(Laughter) I thought bright colors would look good on my daughter.

My daughter prefers dark, muted clothes.

So I kindly went back to my room and told her that she should choose something a little less brooding.

(Laughter) If I could stare and kill, I wouldn't be standing here.

You don't know if you want help, so you can't complain if people don't offer to help you.

Studies show that 90% of co-worker help in the workplace is in response to an explicit request.

So I need to say, "I need your help."

there is no other way

To be good at asking, you certainly have to be able to be heard, but there are a few things to keep in mind.

First, when asking for help, be clear about what you want and why.

Vague and indirect requests for help are not appreciated by the helping side.

Because I don't know what you want, and I don't know if I can help you.

I don't want to do anything to make things worse

I'm sure all of you have been asked by someone you don't know very well on LinkedIn or something like, "I'd like to meet you for coffee, and get to know you."

I always ignore such requests

It's not because I'm an unkind person

If you don't know what kind of help you can offer someone, you don't care.

anyone would be

I'd be more interested if you could tell me exactly what you want, because there must be something specific you want.

So I want you to say, "I'd like to talk to you about opportunities to work for your company," or "I'd like to propose a joint research project in a field that interests you," or "I'd like advice on how to get into medical school."

I can't help you with the last one -- I'm not your "doctor" -- but I think I can introduce you to someone who can help.

Here's the next tip

This is important, please avoid disclaimers, apologies and bribes.

very important

Does this sound familiar to you?

"I'm sorry to ask you this, but..."

"I really don't want to bother you, but..."

"If there was a way to get by without asking, I'd do it..."

(Laughter) When we ask for help, we tend to try so hard not to look weak or greedy, but we overlook how uncomfortable that can make us feel.

Is it really fun to help someone who generally doesn't want to ask for help?

It's okay to pay to ask someone you don't know, but when it comes to motivating friends and colleagues, you have to be careful.

When you're in a relationship with someone, helping each other is a natural part of the relationship.

That's how you show that you care

And when you bring motivation and payment into it, it starts to feel more like a transaction than a relationship.

And that creates distance, which ironically reduces the chances of getting help.

So when someone helps you, it's nice to give something as a token of gratitude.

There's a problem with offering payment to your best friend who helped you move.

Tip number three, seriously, don't ask for favors via email or messenger.

really please stop

emails and messengers are impersonal

Sometimes there's no other way, but emails and messengers are usually less embarrassing.

Don't be embarrassed by email Do you know what else there is?

to refuse

There's research to back it up

If you ask for help directly, you're 30 times more likely to get a yes answer than if you use email.

If you really need someone's help with something important, set aside some time to meet to make a request, or use your phone as a phone -- (Laughter) and ask for the help you need.

here's the last tip

This is very important, but it's also one of the most overlooked things when it comes to making requests.

There's a common misconception that the part of us that is rewarded for helping others is the act of helping itself.

incorrect

The rewarding part of helping people is knowing what the result was, whether it really worked.

If you don't know the consequences of your help, how are you supposed to feel about it?

I've been a college professor for many years, and I often write letters of recommendation for employment and graduate school.

I don't know what the outcome was for maybe 95% of the time.

How do I feel about the time and effort I put into it? What if you have no idea if you helped the other person get what they wanted?

This sense of effectiveness makes certain types of donation requests very compelling, because you can clearly imagine the effectiveness of your donation.

For example DonorsChoose

When you go to this site, you can choose which teacher's classroom you want to support, and which specific items you want to buy, like microscopes, laptops, flexible chairs.

In this way, it's easy to imagine what will happen with your money, and you can feel the immediate impact of your donation.

Do you know what else they are doing?

follow up

The donor will receive a letter from the children in that classroom.

photo will be sent

I know what a difference I've made

This is something we should do on a daily basis, especially if we want the other person to help us sustainably over the long term.

Tell them that what your colleague did was very helpful in getting you a big contract, or that you got the interview you really wanted.

Tell the person that their spouse helped them get through the tough times.

Please tell the person who took care of the cat that he did a good job and that he didn't break anything while I was away and I'm very happy.

Let's wrap it up, I know it's not easy to ask for help.

everyone is afraid

I feel like I'm showing my weakness

But modern work and life is not something you can do alone.

No one succeeds in nothing

More than ever, we need the help and cooperation of others to succeed.

Say it clearly when you need help

And when you do, do it in such a way that you're more likely to get a yes response, and make the other person feel good about helping you, because you deserve it.

thank you

"Who?"

This question, whispered in the dark, opens a tale of intrigue, deception, and moral uncertainty.

The answer to this question is not simple, because everyone in this play has something to hide.

In Hamlet, written by William Shakespeare between 1599 and 1601, the titular hero is haunted by the past and stuck in the prospect of the future.

Only a few months after his father's sudden death, Hamlet returns home from college to find himself a stranger and deeply apprehensive about what lurks in the darkness.

But his gloomy mood is turned upside down by a visit from a ghost with his father's face.

The ghost tells Hamlet that he was the victim of "the most abominable murder" and that his Uncle Claudius usurped the throne and stole the heart of Queen Gertrude.

The prince's grief turns to anger as he plots revenge on the new king, Claudius and his co-conspirators.

The play is a bit unusual for a tragedy, lacking the sudden ruthlessness and fervent love that characterize Shakespeare's other tragedies.

Instead, it delves into the hero's indecision and the tragic consequences of it.

After being exposed by a ghost, Hamlet faces many dilemmas: what to do, who can he trust, and what should he do to get justice.

These challenges are intertwined with characters, and Hamlet must come to terms with friends and family—courts, crushes, and others with their own agendas.

The prince keeps delaying and hesitant about how to get his revenge by engaging with others.

Hamlet, therefore, is both a frustrating figure and one of Shakespeare's most human characters.

Without rushing into action, Hamlet becomes entangled in the horror of the very act of devising a plan.

As the play progresses, his endless questions echo through the audience's frantic, thoughtful minds.

Shakespeare achieved this using very introspective language.

From the usurped new king's intense contemplations about heaven and hell, to the prince's own long, hesitant musings about death, Shakespeare's wistful monologues are to breathtaking effect.

This is perhaps reflected in Hamlet's most famous outpouring of anxiety: "Life or death - that is the question. Which is the nobler way of life? To bear the arrows of anguish rushing in, Or to face a sea of ​​troubles with a sword and finish it off with the finishing blow?"

This monologue embodies Hamlet's ontological dilemma: torn between thought and action, unable to choose between life and death.

But his endless hesitation leads to another concern: Is Hamlet's madness a performance to trick his enemies, or is the audience watching a character about to go insane?

This question weighs on every interaction between Hamlet and another character.

Hamlet's introspection throughout the play often misses the catastrophe he has brought upon himself.

Hamlet is especially cold to Ophelia, and the Prince's capricious behavior drives this unfortunate lover insane.

Her fate shows how easily tragedy could have been avoided, and the cascade of Hamlet's destructive psychological warfare.

Over and over again, similar signs of tragedy go unnoticed throughout the play.

Ophelia's father sometimes dismisses Hamlet's alarming behavior as "just a lovestruck."

In other situations, deliberate duplicity causes tragedy, such as misidentification leading to further deaths.

These moments illustrate the unpleasant fact that tragedy stems from human error. Even indecision can be a mistake.

For these reasons, there is no doubt that Hamlet is human.

But it always makes me wonder who the "real" Hamlet is.

A noble son seeking revenge for his father?

Or is it the mad prince bringing chaos to the court?

Should I act or should I wait? Should I doubt or should I trust?

who is he and why is he here

And who is it that waits in the darkness?

Most of the forest lives in the shadow of the giant trees that form its top canopy.

These trees are the oldest trees, with hundreds of children and thousands of grandchildren.

We confirm safety with the surrounding trees, share essentials such as nutrients, and share the wisdom we have cultivated over our long lives.

We do all this without talking, reaching out, and staying grounded without moving.

The secret to their success lies in the forest floor, with its vast root system supporting towering trunks.

Cooperating with these roots are symbiotic fungi called mycorrhizae.

These fungi branch endlessly and have thread-like hyphae that combine to form the mycelium.

The mycelium spreads over a much wider area than the root system of a tree, connecting with the roots of different trees.

This is how mycorrhizal networks are built.

Through mycorrhizal networks, fungi are able to exchange materials and signaling molecules between trees.

The oldest trees have the largest mycorrhizal networks, many of which are known to be connections with other trees, but these connections are very difficult to trace.

Because there are about 100 species of mycorrhizal fungi, and trees can be symbiotic with dozens of different fungi, each of which has its own unique combination of fungi that connects to other trees, and each tree has its own combination of fungi.

To understand how materials flow in this network, let's focus on sugars and see how they flow from the growing tree to the surrounding seedlings (the newly sprouted plants).

The journey of sugars begins in the leaves of the tallest trees above the canopy, high above the ground.

The leaves use the excess sunlight in the upper layers to produce sugars through photosynthesis.

This vital nutrient travels through the tree, forming a thick sap that is transported to the base of the trunk.

Sugar flows from here to the root

When mycorrhizae encounter the root tip, they cover or penetrate the outer root cells, depending on the type of fungus.

Fungi, like trees, need sugars for energy, but they can't make them themselves.

But fungi can collect nutrients from the soil and deliver them to tree roots more efficiently than tree roots.

Normally, substances flow from where they are abundant to where they are not so abundant, from the source to the suction.

What that means is that the sugars flow from the roots of the tree to the mycelium.

As sugars enter the fungus, they either pass through the interstices between the hyphal cells or through specialized hyphae, which are cavities that are responsible for transport.

The fungi take up some of the sugars, but some enter the roots of adjacent seedlings, and seedlings that grow in the shade are less able to photosynthetize the sugars.

But why do fungi send goods from tree to tree?

This is one of the mycelial network mysteries.

It makes sense that the fungi and the trees would exchange nutrients and sugars in the soil.

In some not-so-obvious ways, fungi seem to benefit from being part of the tree's network, but the exact mechanisms aren't quite clear.

Maybe the fungi take advantage of connecting to as many different trees as possible, and the molecules shuttle between the trees to maximize their connections.

Or maybe the trees don't contribute as much to the fungi if the fungi don't facilitate the exchange of substances between the trees.

For whatever reason, these fungi are responsible for transmitting a tremendous amount of information between trees.

From the mycelium, trees can tell whether nutrients and signaling molecules are coming from their own species.

What's more, the trees know when information comes from close relatives, such as siblings or parents.

Trees can also share information about events like droughts and insect attacks in their fungal networks, anticipating threats and increasing the production of enzymes that help other trees to defend themselves.

Forest health relies on this complex communication and exchange.

Everything is so deeply connected to each other that what affects one species affects another.

How can we look at the different viruses that surround us and use them for medicine?

And can we combine our vast knowledge of virology into one portable test?

We want to condense all of the viruses and virus detection knowledge into, say, a tiny chip like this.

Projects like this -- the idea of ​​using one test to detect multiple pathogens at the same time -- usually have a few problems.

Viruses are pretty complex, and they're evolving rapidly.

This is a picornavirus

Some picornaviruses cause the common cold and polio.

This is what the virus looks like. The yellow parts are the rapidly evolving parts of the virus, and the blue parts are not changing rapidly.

Developing reagents to detect a wide range of viruses is problematic because viruses are constantly evolving.

But there's a balance to evolution, where some parts evolve violently while others change very little.

So we focused here and I'll show you the data.

What you can do with a normal computer

I cut different picornaviruses that cause the common cold and polio into smaller pieces.

First, let's take the example of the Coxsackievirus.

The parts shown in blue are the same nucleotide sequences found in the genomes of other viruses.The same nucleotide sequences found in the genomes of other viruses.

Look at the sequence here. It doesn't even code for a protein, but it's a perfect match for this whole class of viruses. Using this sequence as a marker, we can detect a wide range of viruses in this class without going through individual virus detection.

This area is a rapidly evolving place with diverse arrays.

There's less diversity in the parts that are evolving slowly.

On the other hand, for example, Acute Honey Bee Paralysis Virus, which bees want to avoid, has almost nothing in common with Coxsackievirus.

So we can group together these evolutionary "superconserved regions" that show how viruses have evolved, and we can pick DNA and RNA sequences from these regions and use them as detection reagents on the chip.

So how did we make this chip?

Ever since I was in graduate school, I've been experimenting with making DNA chips, printing DNA onto glass.

The little white dots are the DNA on the glass, and thousands of spots of DNA can be placed on a glass chip and used as detection reagents.

If you look at the chip with an atomic force microscope that's at Hewlett-Packard, if you look at it with an atomic force microscope, you can see the DNA strands attached to the glass.

We're printing DNA onto the glass, and these strands of DNA are markers for pathogens.

We're also building small robots that make chips.

If you have the money to buy a Camry-class car, you can build this robot, and there are free instructions on the web about how to do it, so you can use off-the-shelf parts to build this robot.

You can build a DNA chip maker in your garage.

This is how to make an emergency stop button

(Laughter) Any important machine needs a big red button.

It's a very solid machine

You can make DNA chips in your garage, and it's a lot of fun to decipher the genetic code so quickly.

(Laughter) It's a really cool project.

As I said earlier, when you go to the hospital and you can't get a diagnosis.

So I've included all the respiratory viruses, and also the herpes virus for comparison.

As a scientist, the first thing you do is make sure your experiments work.

So we'll infect tissue culture cells with different viruses, and then we'll fluorescently label the genetic material that comes out of the cultured cells -- mostly nucleic acids from the viruses -- and see where it binds to the array of viruses.

If the base sequences of the DNA match, they will stick together, so when observing the spots

If there is a glowing spot, it indicates the presence of a particular virus.

And what I'm showing you is that chip, the red spot is the signal from the virus.

Each spot represents a different family or species of virus Each spot represents a different family or species of virus

This is an elaborate observation method, where each virus family is displayed with a short barcode to make the results intuitive.

If you look at tissue culture cells infected with adenovirus, you'll see a yellow barcode next to the adenovirus.

Similarly, parainfluenza type 3 -- a paramyxovirus -- but the infected cells are

I also tried it with the little barcode RS virus here

This virus is the bane of daycares across the country This virus is the bane of daycares across the country

(Laughter) You can see that it's completely different from parainfluenza type 3, which is in the same family but can get severe.

It gives you a unique signature, the fingerprint of the virus.

Polio and rhino are in the same family and very similar.

Rhinoviruses cause the common cold, and polio, as we all know, can be distinguished from each other.

Herpes virus associated with Kaposi's sarcoma shows unique signature

Viruses can be identified by looking at the barcode as a whole, not just one stripe.

Now, let's focus on one rhinovirus, and this is a zoomed-in version of that rhinovirus barcode. What about different rhinoviruses?

Do you know what species you are infected with?

As far as researchers have compiled, 102 similar species are associated with the common cold, and new viruses are discovered each year.

There are four types of rhinoviruses here, and even the naked eye can recognize barcodes without complex computer recognition software algorithms that perform pattern matching.

I'm cheating a little bit here, because I knew the sequence of all these rhinovirus genes, and I could have used them to design a chip.

I don't know the array of new finds

These four rhinoviruses are unknown and unsequenced, but each has a unique pattern.

We may be able to collect the "fingerprints" of all viruses and create an information library.

But this is still too easy as fishing in a cage.

not virus obtained from tissue culture

Can real people use this method?

Each person's situation is different

You don't know what's in the saliva, the sputum, and so on, and it's very complicated.

It contains a lot of viruses, bacteria, and even human genetic material.

then what should i do

Can you make a positive control for the test?

it's actually easy

I'm getting a nose wash

The point is, let's try to infect the virus experimentally.

It's been approved by the Institutional Review Board, and we're paying our subjects.

It's basically an experimental infection with the common cold virus.

Better yet, bring a patient from the emergency room with a community-acquired respiratory tract infection of unknown origin.

I don't know what kind of patients really come to the hospital.

So let's start with the infected person, the healthy person.

Let's see what happens when we inject the virus through the nose.

Day One: Nothing Happens

healthy and virus free

Even though you look healthy, I thought you were full of viruses because you had an injection

almost nothing looks perfectly healthy

Day 2: We see a distinct rhinovirus pattern, very similar to what we see in laboratory tissue culture experiments, we see a distinct pattern.

But it's still kind of cheating as an experiment.

(Laughter) Because the experiment was successful, he actually caught a cold.

But what about the patients who come to the hospital?

Two patients identified by anonymous IDs.

Both of them are infected with rhinovirus.

It's a new rhinovirus that no one has ever seen before.

The evolutionary conserved sequence, which I just mentioned, can be used to detect new, unstudied viruses, because it looks at the parts that are conserved through evolution.

Let's play a diagnostic game

The viruses shown here are members of the paramyxovirus family.

Fortunately, it doesn't appear to be canine distemper.

(Laughter) But if you look at block 9, you can see that it's RS virus.

Maybe you have small children at home, and we also found a related virus, RSVB.

very nice

Two samples were taken from this patient on separate days.

I had parainfluenza type 1, and the stripes you see here are the Sendai virus, a form of murine parainfluenza.

It's very genetically related, and it's going to be interesting.

until now

all viruses found

plant viruses insect viruses marine viruses

We put all the sequences from the national genetic databanks into this chip.

I'll explain what these chips are used for.

A huge chip like this is going to need informatics, and we've devised a system to do automated diagnostics.

It's a system that uses hypothetical patterns. It's impossible to get a sample of every virus, but you can use hypothetical patterns to compare real results and score very complex patterns. How likely is it to be a rhinovirus?

in such a way

So, for example, if you take cultured cells that are chronically infected with papillomavirus, and do a computer analysis, the algorithm shows papilloma type 18.

It was exactly this virus that was infecting these cells in culture.

Let's take on some difficult challenges

we have undiagnosed patients

At a hospital near San Francisco, call me when you come to the hospital.

I am asking

This is the case that happened three weeks ago.

I'm a healthy 28 year old woman who doesn't smoke or drink alcohol and has no travel history.

Symptoms included 10 days of fever, night sweats, bloody sputum, hemoptysis and muscle pain.

I went to the hospital, was prescribed antibiotics, and went home.

But the fever didn't go away, and 10 days later, when I went back to the hospital, I was hypoxemic -- there wasn't enough oxygen in my lungs.

CT scan result

Healthy lungs appear black overall.

All white areas are bad

Shadows like this tree and buds indicate inflammation, most likely infection.

After 3 days of treatment with third-generation cephalosporin antibiotics and doxycycline, which had no effect, he developed respiratory failure.

I needed to be intubated and put on a ventilator.

I couldn't breathe on my own.

What next? I do not understand

And we changed antibiotics, why it's the flu.

I don't know what you thought, but it was changed to Tamiflu.

On the 6th day there is nothing else to do

An open lung biopsy was performed

8% mortality rate from testing alone. What do we know?

this is the test result

not a pathologist

You can see that I have bronchitis with a lot of swelling.

The conclusion is 'unknown'.

hospital's own tests

More than 70 different assays were performed, all of the existing tests for bacteria, fungi, viruses, including SARS, metapneumovirus, HIV, and RSV.

It cost me over $100,000, and it was all "negative."

As a hospital, we did the best we could.

We got a call on the eighth day

I received a sample of endotracheal aspiration Fluid from the intubation tube Fluid from the intubation tube

When the liquid was put on the chip, what

Parainfluenza type 4 emerged

Normally, we don't test for parainfluenza type 4.

Very little of the base sequence has been elucidated.

epidemiologically

little researched

Because no one thought it would cause respiratory failure.

Why? This example is just an anecdote. We have no data on whether the disease is mild or severe.

But now we know that even healthy people can get seriously ill.

But it's just one case report.

Now, in the last two minutes, I'm going to talk about a study that's coming out tomorrow, a case that shows how this chip can be applied to make new discoveries.

We all know about prostate cancer, the third leading cause of cancer death in the United States.

There are many risk factors, one of which is genetics.

About 10% of prostate cancers are genetic

Early-onset prostate cancer involves a gene called RNASEL.

It makes antiviral defense enzymes.

So we thought, why do we get prostate cancer if our antiviral defense system is defective?

Is it affected by viruses?

So we analyzed DNA from over 100 tumors on the chip.

We know which ones are defective in RNASEL.

The portion of the chip that gave a positive signal was a retroviral nucleotide sequence.

A man with a defective antiviral defense system and cancer had a 40% chance of testing positive for an unknown retrovirus.

A little discovery, don't you think?

So we cloned this virus.

Automated computer analysis only reveals that it's very similar to a rat virus.

I didn't know, so they cloned the whole virus.

This is the viral genome

It's a classic gammaretrovirus, but it's something no one has seen before.

The closest analogy is the mouse virus, so I decided to call this virus a "xenotropic retrovirus" because it infects animals other than mice.

This is a phylogenetic tree showing how it's related to other viruses.

After looking at a large number of patients, we can say that the source of infection is all individual.

It's the same virus, but it's thought to have been infected separately in different ways.

Was this virus really inside the cancer? that's right

When we took the cancer, sliced ​​the tissue, and located the virus, we found cells with viral particles.

The patient was indeed infected with the virus.

Is this virus the cause of prostate cancer?

I don't know the cause and effect yet.

No association with carcinogenesis is known

Are these patients susceptible to viruses?

It's possible, but it may not be related to cancer.

but it's just a possibility

At this stage, there is a strong link between the presence of the virus and mutations in genes associated with cancer.

i only know that

The more research you do, the more questions you have. That's the strength of science.

This is the result of the efforts of everyone in the lab.

This is a collaboration between me and Don.

This is the guy who started this project, and this is the guy doing the prostate-related research.

Thank you. (Applause)

How can we get people involved in climate change solutions?

I would like to start with two little experiments.

listen to me and feel the difference

nice one?

let's start

"Carbon dioxide levels are rising and are now around 410 ppm.

Rapid decarbonization is required to avoid the Representative Concentration Pathway (RCP) scenario value of 8.5

There is a 66 percent chance of meeting the 2 degree target, and the global carbon budget is about 800 gigatonnes.”

(Laughter) Now, from a different angle.

"Our planet is becoming barren. Huge storms. Murderous floods. Wildfires devouring the greenery. Fierce heat waves from the scorching sun.

Temperatures in 2017 are already unexpectedly high, terrifying climate change scientists

We only have three years left to cut our carbon footprint, three years.

Otherwise our earth will be a boiling hell."

So (applause) Ladies and gentlemen, how did you feel about the difference in my storytelling?

The first one is just confused because it feels like it's just a stranger?

What are you talking about? and

Or maybe you felt scared or just helpless?

And when I repeat the question, "How can we get people involved in solving the problem of climate change?"

Why are these two ways of talking ineffective?

The biggest obstacle to climate action is in your head.

Based on the rapidly growing field of psychosociological research, I have so far researched five psychological barriers that keep people away from problems [5 Defenses].

When people hear the news about climate change, the first thing they do is reject it. They try to put distance.

When I hear the news about climate change, I think of Arctic ice and polar bears as if it were some distant universe, and as if it's the far future, I think of 2100.

Huge, slow change Gigatons Centuries in size

I think I'm irrelevant to where I am now.

Because it's far from me

there's nothing i can do

In our day-to-day lives, most of us tend to think about things that are familiar to us, like our jobs, our kids, how many Facebook likes we get.

it's a real thing

The next psychology is "Fate (Doom)"

Climate change is usually portrayed as a looming disaster: loss, cost, sacrifice.

we feel fear

But after being horrified, I'd rather avoid the topic altogether.

After 30 years of terrifying climate change communication, more than 80 percent of media stories still use this disaster framing, but people have grown accustomed to it, and its overuse has become numbing.

Many of us are suffering from what I would call eschatological fatigue in the flood of apocalyptic depictions.

The third self-defense is “cognitive dissonance”

When we learn that our use of fossil fuels contributes to global warming, and that our actions -- driving, flying, and eating beef -- contribute to it, so-called cognitive dissonance kicks in.

discomfort in the heart

I feel like I'm a hypocrite

In order to get rid of this discomfort, the brain begins to think of ways to justify it.

For example, "My neighbor's car is bigger"

"Even if you review your diet, if it's just you, it won't help you at all"

You can even question climate science itself.

"The climate is always changing"

These justifications make us feel better, but they also come at the expense of the truth.

This is how behavior transforms attitudes

My personal cognitive dissonance comes when I find myself flying from Oslo to New York and back to Oslo and back giving a talk on climate issues.

(Laughter) It's just a 14-minute talk.

(Laughter) That's why I want to denial.

(Applause) If we keep our mouths shut, ignoring or ridiculing the facts of climate change, we may be able to escape fear and guilt.

Reality denial does not arise from a lack of intelligence or knowledge.

It's a state of mind in which you're aware of a troubling situation but pretend you don't know it.

So it's kind of a double life, knowing and pretending not to know, which is often reinforced by others, like family and community, trying to distract us from this difficult issue.

Finally, there is Identity.

Concerned climate activists are demanding that governments take action with some kind of regulation, carbon tax, etc.

But think about what happens when conservatives, for example, hear activists say the government should be bigger than it is now.

Especially in the rich Western democratic cultures, they tend not to believe in climate change science.

What do you mean?

For example, if I were a conservative, I would probably prefer a decent big car and small government, not a small car and big government.

And when climate scientists come along and tell them that government should expand its role, they'll lose faith in science.

Thus, cultural identity begins to rewrite reality.

The person's values ​​undermine the facts My identity will one day trample the truth

After observing the mechanism by which the 5D keeps us out of trouble, let's think about how to overcome it.

New research shows how we can reverse these five defenses to make climate communication more accessible.

Now here's where things get interesting.

First, we convert the distance to the problem into social.

It makes the climate problem feel personal, personal, and urgent. And we can do this by promoting social norms that are positive for solutions.

If I believed that my friends, neighbors, or you would take action, I would too.

This can be seen, for example, in solar panels.

Solar panels are spreading like a virus from house to house.

it's contagious

This is the power of peer-to-peer to create the "new normal."

Then turn pessimism into supportive.

Rather than ineffective framing of disasters and costs, we can reframe climate issues as more about human health. For example, a delicious plant-based burger is good for health and good for the climate.

We can also see climate as an opportunity to introduce new technologies, to create safety jobs and new jobs.

The photovoltaic industry is experiencing tremendous growth

recently achieved 3 million jobs created

To create a collaborative mindset, we need balanced information that should present three positive and supportive framings for each climate change threat.

And we can turn cognitive dissonance into simpler actions.

This is often called a "nudge"

Well-designed options to ensure that climate-friendly actions are the normal and optimal choice, to make climate-friendly actions easy and unconscious to choose.

Take the issue of food waste as an example.

If the size of plates and boxes could be made a little bit smaller, the amount of food wasted in places like buffets would dramatically decrease. The amount of food on a small plate would appear to be more, but in a larger box it would seem so little that it would be tempting to have more.

Using smaller plates means a lot less food wastage.

There are hundreds of little "nudges" like this

The point is that cognitive dissonance subsides as more behaviors are nudged.

And then you can reverse reality denial by adjusting Signal to make progress visible.

It gives you motivational feedback about how much progress you're making in solving the problem.

For example, reducing the carbon footprint of vehicles, or reducing energy waste in buildings.

An app called Ducky makes this possible

And if you record your actions, you'll get real-time signals that you can visualize the achievements of your people and your company.

Lastly is identity.

This can be changed with an effective story

our brains love stories

So we need more stories of future worlds that we want to be, and stories of different heroes and heroines who are actually making change happen.

I am proud to say that my hometown of Oslo has embarked on a daring journey to electrify all forms of transport: cars, bikes, buses.

Christina Boo is one of the leading figures in this movement.

For many years, I fought every day as the secretary general of the Norwegian Electric Vehicle Association.

Now Britain, France, India and China have also announced plans to ban the sale of fossil fuel cars.

this is a big move

In Oslo, you can feel the enthusiasm of electric car owners eager to spread the word to their friends and neighbors.

So narrative returns to social.

Thousands of climate change talkers around the world are starting to use these solutions individually.

But it is clear that individual solutions alone cannot solve the climate change problem, and we need stronger bottom-up support for legislation and solutions.

This is why getting people involved is essential.

I started this talk with two ways to talk about climate change.

There are other narratives, let's show them

It starts with rethinking the climate problem as a living atmosphere.

Climate change is not a remote, abstract, distant problem to us.

This very air that surrounds us

The air I feel in this nostril that I feel in this room

This air is the skin of our planet

The size of the Earth, and the air that protects us from its effects, is astonishingly thin compared to the universe, much thinner than the thickness of a skin the size of an apple.

When you look up at the sky, the endless but beautiful, breathable air is only eight to eleven kilometers thin and fragilely envelops a giant ball.

Inside this skin we are connected

Your breath just now contains 400,000 of the argon atoms Gandhi breathed in his lifetime.

All life is nurtured and protected inside this thin, shimmering, uncertain membrane.

It keeps and regulates the temperature just right for water and life, separates the blue ocean from the blackness of space, and clouds hold the billions of tons of water our soil needs.

The air melts into the river, stirs up the water, and delivers it to the forest.

The climate is going crazy around the world. It's okay to feel scared and lose hope.

The new mindset of climate action is to throw away the shackles of abstraction and eschatology, to embrace science and choose to start telling new stories.

This is the story of how we can reverse and reduce global warming.

These are the stories of where we are going, stories of people, cities, businesses, and public institutions that defy headwinds and take care of the atmosphere.

This is the story of our progress, because that's how we should be as human beings in this living atmosphere.

thank you

(applause)

So let's get started. I'm going to play. Please listen. (Applause) (Music) (Applause) Thank you! (Applause) I took my shoes off to dance, but we'll save that for later.

Well I... where do I start

I'm thrilled to have the opportunity to tell you a little bit about the music I've studied, my family, and more. It's dying out in Cape Breton.

The traditional language is Gaelic, but a lot of the music comes from Gaelic, dancing, singing, everything.I'm of all Scottish ancestry, but my father and mother are both very music lovers.

My mother taught me to dance when I was five, and my father taught me how to play the fiddle when I was nine.

My uncle is a very famous Cape Breton fiddle player.

He's called Buddy McMaster, and he's just amazing. We have a tradition of square dancing.

"Caley" is the Gaelic word for party, and kitchen parties are very common in Cape Breton. They start with someone stopping by a house, and it's safe to say that in Cape Breton, every house has a fiddle. So, it was a great environment to grow up in, and it was in those places that I started making music.

I have recorded many CDs.

I've been nominated for a Grammy and won several awards. It's been an amazing experience, but the best part is meeting my husband. I've known Donnell for about 12 years. It hasn't been long yet, but I'm starting to understand what kind of people this group is.

When I asked Natalie what to do

Because it's okay to talk about yourself

I know it's boring, but let me tell you a little bit about my family. I'm 11 and I'm from Lakefield, Ontario, about an hour and a half northwest of Toronto. We grew up on a farm.

My parents raise beef cattle and I'm the eldest son.

I have four older sisters who are a little older than me.

We grew up without television.

People thought it was weird, but I think it was great.

I had a TV for a few years, but of course I decided not to have it because it wasted so much time and I couldn't get the job done.

We grew up playing music - my mother was also from Cape Breton.

My mom and Natalie's mom knew each other, and we grew up playing instruments and dancing together.

(Laughter) I think growing up learning to listen to and play a lot of different songs was really important, because I wasn't exposed to so many styles of music that often.

We learned how to play an instrument, but in a way, we had to use what was inside. We didn't have television, we didn't listen to much radio. Sometimes we went to church and school and helped out on the farm and played music. Also called the French Canadian style, it originated in logging camps.

Many years ago, hundreds of people used to go to the logging lands of northern Ontario and Quebec for the winter, and there were all sorts of different cultures -- Irish, French, Scots, Germans -- coming together night after night to play cards, to step dance, to play the fiddle. Then I met Natalie and I was exposed to the wonderful Cape Breton fiddle playing.

That's how we met. (Laughter) You talk. (Laughter) You don't want to talk? (Laughter) Looks like it's my turn to speak.

And what's really interesting is that Donnell's environment is very similar to the one I grew up in. I saw Donnell play when I was 12 years old. He came with his family to Inverness. I danced with them, and my mom said, 'That's Julie McDonnell, we danced together when we were kids.

I don't think my mother would have guessed that in 12 years, or 20 years, her children would be married.

I said, "I know

I have your tapes at home."

He continued, "I'm in Truro," where I lived at the time, and he invited me to dinner.

(Laughter) (Applause) So — shall we continue? (Laughter) (Laughter) We dated for about two years, broke up, separated for 10 years, got back together, and got married. (Laughter) (Applause) Now we're running out of time.

I will ask you a song

I chose a Scottish song

Start with slow air

Eyrs are played in Europe at funerals, when bodies are carried from the wake to the cemetery, and the funeral procession is led by a piper or fiddle player.

I'm going to play a little bit of a short air, and then I'm going to play a little interesting song, but it's a difficult song to play if you're not prepared, so if you fail, pretend you like it.

(Tunes) (Laughter) (Music) (Applause) So now we'd like to play together. (Applause) We're laughing because our styles are so different.

So Donnell and I are in the process of writing new songs that we can play together, but none of them are finished yet.

I just started yesterday (Laughter), but let's play something together.

in one minute, in one minute

(Audience reaction) Start with you, no, start with you

There's your way (music) I'm out of tune, wait a minute

(Sound of tuning) Sounds like you're doing a duck or bird pose. (Laughter) (Music) (Audience clapping together) (Applause) Announcer: Good news.

you have 10 minutes left

(Applause) Okay.

yeah ok

Let's go on (applause) (sound of tuning)

what do you want to play

Well, uhm... (music) (laughter) Okay, how fast?

not too fast

(music) (audience clapping in unison) (cheers) (audience clapping in unison) (music) (applause) We'll play a song together, but Natalie will accompany us on the piano.

The Cape Breton piano playing is amazing.

My mother plays the piano, but she said she learned it when we didn't have one at home in Cape Breton. Before my mother's family bought a piano in Cape Breton, she said she learned it by playing rhythms on the board. carried home

It was the first piano in the area at the time -- my mom says she could play it as soon as it arrived. She learned all the rhythms, so she could play.

That piano had passed through five or six families, and it was dear to us.

Anyway, enough useless talk

okay tell me about rahi

What are you talking about Lahey? (Laughter) Tell me -- she wants me to tell you -- we have a band called "Lahey."

We're 11 brothers and we're -- what can I say? (Laughter) It's not about surgery that we opened.

I agree

I had a great chance

For two years, he opened for Shania Twain's international tour.

It was a big deal for us. My sisters are all on maternity leave and the boys just got married, so they'll probably be home for a few more weeks.

what should i say I don't know what to say Natalie We're uh... (laughter) (laughter) Is this what marriage is all about?

(Applause) Not bad. Brothers and sisters wait wait wait wait It's midnight and they're still sitting at the piano That's how my parents made us practice Shall we play a song? it worked ok

I don't want to continue...

It's the last song. Natalie plays the piano.

Okay How about in A major?

(music) (applause)

As a robot developer, I am often asked

“When will robots start making breakfast for me?”

I wondered if future robots would look more like humans.

I thought it would look like me, so I created eyes that imitated my own eyes.

I made a dexterous finger so that you can pass things to me.

like a baseball

A classic robot, like this one, consists of a fixed number of joints and drives to function.

What this means is that function and form are fixed at the conception stage.

Even if this robotic arm can throw a great ball and hit it against a camera tripod, it's not going to make you breakfast.

It's not suitable for making scrambled eggs.

This is the moment when I came up with my vision for the robot of the future: transforming robots.

It drives like a car, runs like a man, flies like a bird, and morphs to suit its new environment and the task at hand.

To make this happen, we have to rethink how we design robots.

Imagine you have a polygonal robot module, and you can use the simple polygons to reconstruct different shapes to create different shaped robots for different tasks.

Computer graphics is nothing new, and many movies have been made that way for quite some time.

But if you're trying to build a physically moving robot that way, it's a whole new story.

It's a completely different paradigm

but you've already done it

Who has never made a paper plane, a paper boat, or an origami crane?

Origami is a versatile tool for designers.

You can make different shapes out of a sheet of paper, and if you don't like it, you can unfold it and fold it again.

It's mathematically proven that you can create any three-dimensional shape from a two-dimensional surface by folding it.

What if you had an intelligent piece of paper that could self-fold and morph into any shape you wanted at any time?

that's what i'm working on

I call this origami robot "Robogami"

This is the first Robogami transformation I made about 10 years ago.

A flat sheet robot becomes a pyramid, back to a flat sheet, this time a space shuttle.

so adorable

Ten years later, our group has grown to about 22 ninja origami robot researchers, and we've got a new generation of Robogami that's a little bit more efficient and can do more.

A new generation of Robogami serves a practical purpose.

For example, here's a robot that automatically changes its course depending on the terrain.

If the ground is flat and dry, it will crawl

When the terrain suddenly becomes rough, it starts rolling

It's the same robot, but it looks like this: it changes the way the drive moves, depending on the terrain.

Jump over any obstacles

In this movement, each leg stores energy and releases it like a slingshot.

I even do gymnastics

Jump

(Laughter) You've seen how Robogami works on its own.

What if we act as a group?

Work together on more complex tasks

Modules can be active or passive, and can be combined to create different shapes.

Not only that, but by controlling the joints, we can create and challenge different tasks.

shape creates a new task space

Assembly is the most important thing here

It needs to automatically find people in different locations, sticking together and separating depending on the environment and the task.

and it's already done

What happens next?

let your imagination run wild

This is a simulation of what can be achieved with this type of module.

I decided to make something that could walk on four legs, and I made it a toddler puppy.

The same module can be used to create another robot arm, which is a typical, classic robot application.

The robot arm can pick up objects

By adding more modules, you can extend the arm of the robot arm, or even attach a third arm, to pick up larger or smaller objects.

Robogami has no fixed shape or work.

You can transform into any shape anytime, anywhere.

So how do we manufacture it?

Robogami's biggest technical challenge is to make it very thin and flexible while still maintaining functionality.

It has multiple layers of circuits, motors, microcontrollers and sensors, all inside the body, and it can control each joint and move as instructed, even soft movements like this.

Unlike robots built for just one task, Robogami is optimized to do multiple tasks.

This becomes important when working in the harsh and unique environments on Earth and in space.

Space is the perfect environment for Robogami

In space, we can't afford to have dedicated robots for each task.

You never know how many different tasks you'll need in space.

We need robots that can transform for different tasks.

I'd like a set of Robogami modules to transform and perform multiple tasks.

I'm not the only one saying this, because the European Space Agency and the Swiss Space Agency are funding this concept.

Here you'll find images of various configurations of Robogami, some exploring the surface of an alien planet, some digging.

More than just exploration

Astronauts need help too, because we can't afford to take an intern.

(Laughter) Astronauts have to do all the boring stuff.

It may be a simple task, but it's highly interactive.

We need robots to help us in our experiments, to communicate, to support the astronauts, to be the third arm that can stick around and hold the tools.

But how do you control Robogami outside the space station, for example?

This case shows Robogami catching space junk.

You can operate it visually, but it would be even better if you could feel it directly in the hands of the astronaut.

What you need is a haptic device, and a haptic interface that reproduces touch.

If you use Robogami, you can do that too.

It's the world's smallest tactile interface that can reproduce tactile sensations on your fingertips.

This was achieved by making Robogami perform macroscopic and microscopic movements.

By using it, you can not only feel the size of an object, the curvature of an object, the straightness of an object, but you can also feel the hardness and the texture.

Alex is navigating this interface with his thumb, and when you combine this interface with VR goggles and controllers, virtual reality is no longer virtual.

Become a tangible reality

The blue, red, and black balls he sees are no longer distinguished by their color alone.

Feels like a blue rubber ball, a red sponge ball, a black billiard ball

technology that is already available

let me show you

It's really the first time we've done this live in front of the public, and I hope it goes well.

Here's a human anatomy diagram and Robogami's tactile interface.

It does multiple tasks like any other reconfigurable robot.

Not only does it work like a mouse, but it works as a haptic interface.

For example, in the white background area without objects

There's nothing to touch, so the interface is very responsive.

You can use it like a mouse and move it over to your skin or your muscular arms and feel your biceps and shoulders.

I think you can see that it's hardened

Let's find out a little more

Get closer to the ribcage

You can feel the difference in firmness, whether it's on the ribs or on the intercostal muscles, which can be softer or firmer.

It's true

As you can see, it pushes back against my finger with a firm or strong force.

I showed you the non-moving surface.

What happens when you get close to something that's moving? How about a beating heart, for example?

Can you feel anything?

(Applause) You can take your own heartbeat.

If you put it in your pocket while enjoying online shopping

I can tell you how the sweater you're buying feels different, how soft it is, whether it's cashmere or not, or how firm or crunchy the bagel you're buying is.

it is now possible

This robotic technology is evolving to be personalized and adaptable to your everyday needs.

This unique, reconfigurable robot is a platform that provides a non-visual, intuitive interface precisely tailored to your needs.

Such robots are no longer the ones depicted in the movies.

it will be exactly what you want

thank you

(applause)

In 2008, archaeologists unearthed two 9,000-year-old skeletons.

There's no definitive way to know how these ancients died, but we do know that their bones were infected with a very well-known bacterium.

This lung disease was called "cysis" by the ancient Greeks, "chaki onke" by the Incas, and "tuberculosis" by the British.

Now known as TB, tuberculosis is still one of the world's most contagious and deadly diseases, killing more people than malaria or HIV/AIDS.

What is tuberculosis, and why has this pathogen persisted for so long?

Mycobacterium tuberculosis, formally speaking, Mycobacterium tuberculosis, is generally airborne.

enters the human respiratory tract and infects the lungs

In the lungs, immune cells called macrophages travel to infected areas to try to absorb and destroy invading bacteria.

In many cases, this reaction alone eliminates the bacteria.

But for people with other health problems, such as malnutrition, HIV, diabetes, or pregnancy, the immune response may not be strong enough to fight off an invader.

Mycobacterium tuberculosis then multiplies within the macrophages and colonizes the surrounding lung tissue.

As cells become more infected, they release cell-degrading enzymes that destroy infected tissue, causing chest pain and hemoptysis.

Damage to the lungs leads to oxygen starvation.

Then a flurry of hormonal changes begin to occur, including decreased appetite and decreased iron levels.

The pathogen then spreads to the skeletal system, causing pain in the back and immobility, to the kidneys and intestines, causing abdominal pain, and to the brain, causing headaches and even unconsciousness.

These symptoms become typical of tuberculosis: weight loss, a cough with bloody phlegm, and pale skin.

Because of the patient's ghostly appearance, tuberculosis earned the nickname "the white plague" in Victorian England.

During this time, tuberculosis was considered a "romantic disease" because it tended to affect people with weak immune systems, such as struggling artists and poets.

The external symptoms of tuberculosis also sparked the popular vampire legend.

Despite this, or rather because of this unscientific interest, the first steps towards a cure for tuberculosis were taken at this time.

In 1882, German doctor Robert Koch discovered the bacteria that caused disease.

Thirteen years later, physicist Wilhelm Roentgen discovered X-rays, allowing doctors to diagnose the disease and track its progress in the body.

Technologies like these made it possible to develop reliable and effective vaccines.Following the development of a smallpox vaccine, in 1921, scientists developed the BCG vaccine against tuberculosis.

These developments laid the foundation for the modern field of antibiotic development, which is now the most effective treatment for tuberculosis.

But antibiotics can't solve one big problem in TB diagnosis: about 90 percent of people with TB don't show symptoms.

In latent infections, tuberculosis bacteria may lie dormant and only become active when the infected person's immune system is compromised and unable to defend itself.

This feature makes tuberculosis more difficult to diagnose.

And even when correctly diagnosed, traditional treatments can take up to nine months and require multiple drugs with high potential for side effects.

This undermines the patient's desire for a complete cure, and when treatment is half-finished, the bacteria become drug-resistant.

Tuberculosis is still endemic in 30 countries, most of which have other health problems that exacerbate tuberculosis and cause latent infections.

To make matters worse, in many endemic countries, access to treatment is difficult, and the stigma associated with tuberculosis causes some people to refuse the treatment they need.

Health experts are calling for better diagnostics, faster-acting antibiotics and more effective vaccines.

Researchers have already developed a urine test that can diagnose in 12 hours and a new oral drug that can reduce treatment time by 75 percent.

Hopefully, these technological advances could make tuberculosis a thing of the past.

Leah Chase: So pretty

Wow, I've never seen a room like this.

It's so gorgeous, really

beautiful room

Pat Mitchell: With your permission, I was about to say my age, but I was about a year older.

You were 94 years old, right?

(Laughter) (Applause) Leah: Yes, I'm still 94.

(Applause) Well, as you get older, things start to wear out.

My legs are tired

My kids always say, "But you're a good talker."

(Laughter) I keep my mouth moving because I have to keep doing something.

(Laughter) Pat: Ms. Chase, when we first met, you went in with a group of young women who were colleagues at TED, and you walked into the kitchen, and we were standing around you, and you'd already made hundreds of lunches as usual, and you were looking up at your colleagues.

Please tell the people in the audience what you said to the young girls at that time.

Leah: I talk to young women all the time, but I'm starting to get sick of it because I realize I've lived a long life.

I've been with women who had to work really hard and do the hard work -- women who still knew how to be women.

they didn't look down on men

We didn't get the education that women have today, but I'm very proud that women today have all those educations.

And that's why I've worked so hard to make sure that we're in a world where all women have access to resources.

They just don't know what they're capable of. I tell them, "My mother had 12 daughters before she finally had a boy."

(Laughter) That's how I came into this world.

(Laughter) My mother had 14 children.

I've raised 11 of them, and until last year, they were all still alive.

(Laughter) Sometimes we're very picky and difficult to handle, but we're not giving up just yet.

and i like to meet women

You have no idea what it means to me to meet a woman of your social standing.

I had no idea—

To think that women would be able to hold the jobs and positions they have today.

that's just reassuring

A "young" woman came to me

was an african american woman

When asked, "What is your job?"

"I'm a retired Navy pilot."

I don't know what you mean, it just melted my heart, because I know how hard it was to get rid of discrimination in the Navy.

Because the Navy was the hardest to desegregate. It was Franklin Roosevelt who did the desegregation. He did it at the request of an African-American, Lester Granger. I knew him very well.

Roosevelt, who was head of the National Cities League at the time, asked Lester to let him serve as a cabinet minister.

Lester replied, "I don't want to enter the cabinet.

My only desire is to end discrimination in the Navy."

Franklin did just that

But he died before he could finish it, so Truman took over.

But when that woman said, "I've flown everything that flies, bombers, planes of every kind," it almost melted my heart, knowing that women's status has risen so far.

So I said to her, "Well, you could be an astronaut."

And she said, "But Mr. Chase, I'm too old."

She's over 60 now, she's past her age.

(Laughter) Because I don't want to fly anyone over the age of 60.

It's like "stay grounded"

When I meet women — now they all come to my kitchen — it annoys my daughter Stella.

My daughter doesn't like people coming into the kitchen.

But the kitchen is my home, and the kitchen is where you come to see me.

So I will meet anyone who comes

And what really lifts my spirits is when I meet women in action.

I feel good when I see women in action.

I'm not the type of woman to lead the way waving a flag.

You won't see me leading the way

i don't do that

(Laughter) I don't do it, and I don't want you to do it either.

just be a good woman

'Cause my mother said

Because my mother was strict with us, "Leah, you know." She told us this quote: "To be a good woman, you must first look like a girl."

I think I looked girly enough at the time.

"Behave like a lady"

i couldn't

(Laughter) "Think like a man."

Think like a man instead of acting like a man

And "work hard"

(Laughter) We learned that the hard way.

And I was taught to do so

women were taught what to do

I was taught back then that women control what men do.

How a woman behaves makes a difference in how a man behaves

So you have to, I always tell you that

See, don't look down on men

I worry that your husband is not as well educated as you are, but don't look down on him.

I have to put my husband up You don't want to live with a timid person, do you?

You want your husband to do what he's supposed to do as a full-fledged man, right?

And don't forget, my husband runs on cheap fuel.

(Laughter) So get him some cheap fuel.

That's the way it is -- (Laughter) that's the way it is -- Pat: I need some time to understand what you're saying.

(Laughter) Leah: The young lady I was talking to before me -- she was so beautiful that I wished I was too. But my poor husband died after 70 years of marriage.

Seeing that lady reminded me

"My husband would be so happy if I was like her."

(Laughter) But I'm not like her.

Always pushy, always doing something, always doing something, and he would always say to me, "God, you're going to be the one."

(Laughter) "You don't appreciate enough."

But it's not that I'm not grateful, I think, as long as I live, I have to keep working, and when I fall, I have to keep getting up, and I have to do what I have to do.

(Applause) You can't sit down.

You have to keep going, you have to try to do something little by little every day.

I have to improve little by little every day

I spent my life that way

I come from a small town in the countryside, and I had to do everything, fetch water, do laundry, do this and that, pick strawberries and all that trouble.

(Laughter) But my father insisted that we be kind.

that's all

When I heard this young lady speak, what a beautiful voice, I said, "If only I had been like that."

Pat: Mr. Chase, I want us to stay where we are.

that is without a doubt

I have a question

I'm so glad I got to speak to someone like you, you know it's been so many years — Leah: Sure.

PAT: I remember Roosevelt and the person he wished for.

What Leah thinks and thinks, what she's actually witnessed —

One thing you should never forget is that when you opened your restaurant, blacks and whites couldn't eat together in this city.

it was forbidden by law

But let me tell you about how it was different in Dookie Chase.

Leah: We were eating together.

It was my mother-in-law who started it because my father-in-law was sick and he was on the road -- people from Chicago and elsewhere called him a gambling collector.

But in New Orleans, we're so sophisticated (Laughter) that we call them lottery sellers, not gambling collectors.

(Laughter) I called it politely.

I was on the outside anyway

But I couldn't go from house to house and get customers or anything because I was very sick.

My father-in-law had an ulcer and was very sick for a long time.

So my mother-in-law started doing it, but she didn't know anything about it, but she was confident in sandwiches.

I could cook, so I borrowed $600 from the brewery.

In this day and age, can you imagine starting a business with $600 without knowing anything about it?

I am always amazed at what she has

she was good at managing money

i can't do it

My husband used to call me "the bankrupt lady"

(Laughter) "I'm going to spend all the money I've earned."

That's right

Pat: But you could have kept the restaurant going, right? It was a time when controversy was the norm and people were protesting and even boycotting.

Because what you and your husband committed was a controversial act.

Leah: It sure was, but I don't know how we did it. But like I said, my mother-in-law was a very nice person.

they were all white

But when the cops came, my mother-in-law said, "Let's make some sandwiches."

and made me a sandwich

Today we call it a bribe.

(Laughter) But my mother-in-law was just that kind of person.

what to do for people

I also liked giving things

So maybe that's what my mother-in-law did, and we were saved, because no one got in our way.

Jim Dombrowski and Albert Ben Smith came and started doing things right in the restaurant, and nobody bothered us.

so we continued

Pat: sorry

You said the other day that people thought of this restaurant as a safe haven, a place where it's okay to gather, especially when they're working on civil rights and human rights and working to change the law.

Leah: Because once you were inside the door, no one bothered you.

The police never came in, and they never bothered our customers.

So I thought it would be safe to come to the store.

I could eat and make plans

Civil rights "Freedom Ride" activists held all their meetings in our house.

When they came, we served a bowl of gumbo and fried chicken.

(Laughter) That's why I say we changed American history with gumbo and fried chicken.

(Applause) Hey, I'd like to invite the leaders to come to the store and have gumbo and fried chicken and talk it through, and we'll just leave them alone and do their thing.

(Applause) That's all we did

Pat: May I send you a list of people to invite to lunch?

(Laughter) Leah: Yes, I invite you.

Because that's what we lack

not having a conversation

let's get together

It doesn't matter if you're a Republican or whoever you are, please come together.

please discuss

old people know

I've been friends with some great old people, like Speaker of the House Tip O'Neill.

They knew how to get together and talk, and they might have disagreed.

that's okay

I'm talking, we're meeting for good

That's what we were doing at the restaurant.

They used to plan the meeting Oretha Haley's mom —

Oretha was a key figure in CORE

her mom worked for me for 42 years

she looked a lot like me

We didn't understand the CORE program.

No one our age understood this, but they certainly didn't want their children sent to prison.

I don't want to think about that...

But young people don't mind going to prison for their beliefs.

We were working with the NAACP with people like Judge Thurgood and A.P.

But it was a slow step

If I had waited for them, I wouldn't have stood at the entrance yet.

(laughs) Pat: You mean Supreme Court Justice Marshall?

Leah: Yes, I loved Thurgood.

he was doing a good job

They wanted to do it without offending anyone.

I will never forget Tulord's words, "But you can't buy white animosity.

Don't piss off white people

But young people don't care

Young people say, "I'll do it, even if I'm not ready, I'll do it."

so i had to support them

I knew them, they were honest kids.

I had no choice but to help

Pat: And they made a difference Leah: They made a difference

It's been very difficult, but you have to do hard work to make a difference.

Pat: You've seen a lot of transformation.

The restaurant was the bridge

You are the bridge between the past and the present, but you don't live in the past, do you?

you are living in the present

Leah: That's what I want to talk to young people about today.

Sure, you can protest, but the past is the past

I can't hold you responsible for what your grandfather did.

It's the grandfather's responsibility

I have to build on it

Don't bring about change

I can't sit still and say, "Look what they did to us back then.

See what they are doing now

You'll never forget it, but it will keep you going, just don't repeat it every day.

We have to move, we have to move, we have to change, and everyone should be on board.

My kids said, "Mom, don't get political."

(Laughter) "Don't be political, we don't like that."

But today we have to get political.

have to get involved

become part of the system

Think of a time when we weren't allowed inside the system.

When Dutch Morial, who was black, became mayor, there was a different feeling in the African-American community.

we became part of something

We have a mayor

we got a place

Moon tried before Dutch came.

Pat: It's Mayor Mitch Landrieu's father Moon.

LEADER: Mayor Landrieu's father took a really big risk to get an African-American into the city council.

He was punished by social sanctions for a long time, but he was a visionary, and he did it because he knew it would help the city in the future.

He knew he needed our participation.

that is our duty

we don't rant

We can only keep moving forward, and when it comes to Mayor Mitch — I always say to Moon, "You did good things, but Mitch did one thing greater and better than you."

When Mitch took down that statue, I said, "You're crazy."

(Applause) You're funny.

But it was a smart political move.

Because I was sitting on the news watching the statue of P.T. Beauregard being taken down, and I knew what it meant.

For me, it wasn't a race issue, it was a political act.

I was so pissed off that I went back to the kitchen the next day and said, "Let's put on our pants and go to work or we'll leave you."

that's what you should do

Must follow people Must follow what people do

It was supposed to bring transparency to this city.

Now that you have transparency, keep it up, cheer yourself up, do what you gotta do, do it well.

and that's what we do

that's all i'm aiming for

Pat: But you told me how to build resilience, didn't I?

You are definitely the best example of resilience. You must have an idea — Leah: I like emotional strength.

I like people who are physically and mentally strong, so it might not be for me.

My favorite general of all time is George Patton.

I don't really like Patton

(laughs) Pat: That's a surprise.

Leah: I have a picture of General Patton hanging in my dining room because I don't want to forget it.

He set a goal for himself and started working to reach that goal.

he didn't stop

I will always remember his words, "Keep leading, or get out of there."

I can't "lead" people. (Applause) I can't be a leader, but I can "follow" a good leader.

(Applause) But that's the only way.

(Applause) If you can't lead people -- leaders need people to follow them.

lol

(Laughter) Life is like that.

Everyone is capable of something, but please get involved.

please do something

All we have to do in this city, in every city, is for moms to start being moms right now.

you see?

Mothers have to start understanding that when they bring a child into this world, they have to raise a man and a woman out of it, and it's very hard work.

sacrifice must be made

Maybe I should give up long nails and pretty hair.

But children grow up, so it can't be helped

We must focus on educating our children and making them understand their purpose.

Sorry gentlemen, but you need a good woman to do that.

I need a good woman for that

(Applause) Men, do your part.

Do your thing and take the rest home We women can do the rest Leave the rest to us

If you're a good woman, you can too

Pat: I heard this for the first time

"Leave the rest to us"

Leah: Leave the rest to us

Pat: Thank you very much, Chase. Leah: Thank you.

Pat: Thank you for taking time off from your day-to-day work in this community.

Leah: How does this help me?

Thanks to all of you gathering here and seeing me, people from all over the world come to my kitchen.

I've had you come from London twice.

First, a man came to me, and I don't know why, but every year chefs host a "Chef's Charity."

It all started with me as the only woman, as the only African-American, on the stage of a demonstration and stubbornly refusing to leave until the next woman stepped up.

Instead of going up on my own, I'm going to let you carry me up — until the next woman comes up on stage.

(Laughter) Another person came, so I was able to leave.

This man is from London

And then that man was in my kitchen.

He came into my kitchen and he said, "I have a question for you."

So I thought they would ask me something about food.

"Why are these white men hanging out around you?"

(laughs) What?

(Laughter) I didn't understand.

he didn't understand

I said "We work together

This is how I live in this city

We may not visit each other's homes

Once we're going to do something, like this special school fundraiser, we're going to do it together.

that's what we do

And then another woman, this time in an elegant dress, came into my kitchen about a month ago.

"I don't understand what I see in your dining room," said the woman.

"What do you see?" I asked.

What she saw was whites and blacks together.

that's what we do

meet and talk

And work together — that's what we should do

We don't have to be best friends when we work together to improve our city or country.

Just get together and act — that's what we do in this city.

we are weirdos here

(Laughter) No one understands us, but we do have a big feast.

(Laughter) (Applause) (Cheers) Thank you.

(applause)

We're all captives, in our own heads, and we're bound by our own perspectives on how we believe and understand the world.

The modern world is full of information.

Though there are any number of objects to think about, we modify or delete them.

We choose our thoughts and attention

make up a story

to swallow the situation and make mistakes

We all try to follow our own mad compasses, and we all carry things on our backs, but the story itself is very compelling.

Everyone does it, and many of the stories they rely on aren't even their own.

First, when you're a child, you inherit it from your parents, who, of course, also have their own distorted beliefs, dissatisfaction and emptiness.

For better or for worse, children accept that as it is, and when it comes time to go out into society, they think, "I have to be successful in order to be admired," or, "I always put other people's needs first."

But that's just a make-believe. Don't worry, people don't care about you as much as you think they do.

(Laughter) Magic is a great example of how we can manipulate reality and make up stories and mistake them for truth.

I also do stage

My Broadway foray 'Secret' is about to start

I didn't ask you to look

(Laughter) It will start later this year.

I'm trying to do something new with mentalism, which is the shady art of getting inside people's heads.

It was in the 1930s, when mind-reading shows were popular.

This outfit is based on the image of that time.

There was a show at the time called "The Oracle Act."

There, I asked the audience to write a secret question, just like you did, a question that you would ask a fortune teller, put it in an envelope, seal it, and write your initials and approximate seat location on the front of the envelope.

Then a prophet who can read minds picks up each envelope one by one.

I'll answer that question if you're right.

This show has gone viral

People are fascinated by these abilities, because they provide clear and concise answers to life's complex and elusive questions, including anxiety.

Well, I have a question for you all.

I haven't seen it.

thank you

Thank you for your cooperation.

There are a few things I'd like to talk about before we begin.

I swear, first of all, you can't see through the envelope.

It's sealed, and it's a thick black envelope.

You know who wrote it, you can't see through it

The second is important, I don't know you and I'm not a guru with anyone.

not that kind of show

the third is

I don't have any special psychological talents, much less psychic abilities.

let's get started

don't know

(Laughter) If that's- I see.

this is interesting i understand a few things

let's get started

Letters are written in a wavy pattern

It's a feeling of ups and downs, which means that most of the time, if not always, the person himself doesn't know the answer to the question, the question about the future.

is an expression of uncertainty

I'm pretty sure it's a woman.I don't know about her age.It's hard to write, but I think she's in her 30s or 40s.

My guess is that it's a question about the future.

how about everyone in the middle

If you think you wrote it, please tell me

a little hard to see

please wave your hand

you je...

Jane? Jessica?

(Jessica) Yes

(Darren) Which one? (Jessica) It's Jessica

(Darren) It just so happened.

(laughs)

Jessica, I don't want to ask your age, but the main question is about the future?

(Jessica) Yeah. (Darren) Yes?

(Jessica) Yes (Darren) I see.

So what are you asking about the future?

Are you in your late 30's or early 40's?

(Jessica) By the way

(Laughter) (Darren) And that's a very important point.

Once again, "That's how it is"

(Jessica) By the way

(Darren) Are you from Virginia? (Jessica) Yes

(Darren) So... (Laughter) I think this woman wants to leave Virginia.

It looks like you're considering something. I'm wondering if I'm ready to move out.

show me your hand

I want to see the nails on the other side too

You have a farm, do you want to sell it and move out of Virginia?

Are you hitting?

(Jessica) Exactly

(Darren) Good, very good question!

What did you actually write?

(Jessica) "Whether to sell the farm in Virginia or not."

(Darren) Sell the farm?

It's the perfect question to pretend to be a fortune teller, because it's about the future, and you can answer yes or no.

There's no way to prove it

But the danger is that if you answer yes or no, it stays in the other person's head and influences their decision.

Having said that -- (Laughter) Yes, I think you're going to sell the farm, because I see it in a very good way, because you're a do-it-yourself kind of person.

If there's something you want, you're going to focus on it. Are you getting it right at the expense of other things you know should be more important?

Educated- well, say yes again (Jessica) yes

(Darren) No? (Jessica) No

Darren: University of California, Berkeley?

(Jessica) It's Berkeley. Stop it!

(Darren) Got it

I have been to India recently.

Something small started there, huh? no?

(Jessica) Yes, I just got back from India.

Darren: This is just my answer, and I don't mean to call it fate.

(Darren) Thank you. Please sit down.

(Applause) Next is also the middle seat, Mr. A.H.

I think he's a man in his late 40's

A.H., please stand up.

hello mic please

I'll go speedily. Take care of your camera.

Oh look! don't move

stay still

are you standing? Where?

(Male) I'm standing. I'm not short.

(Darren) Yeah

you changed it now

what did you do when you got up

Please answer yes or no. I'm talking about when you're standing up, not now. Left side... left leg or something related to your left leg, right? no?

(Male) Yes

(Darren) It was pretty obvious when I stood up.

Move your weight to the left and say yes

(Male) Yes

(Darren) Take your hand out of your pocket, put your weight on the other side, change the handle on the mic and say "yes" again (man) yes

Darren: Okay, looks like you dislocated your left big toe?

(Male) Yes

(Darren) Thank you very much.

i want to change my mic

give me

around here- thank you

There's a reason I changed the mic Can you hear me?

Because I'm going to blindfold you from now on

This way you don't see any motion to stand up.

I can't see your hands

I can't even see the reaction to my remarks.

I can't even see the person next to the questioner.

It's pretty effective when people around you know the answer.

No tricks like that, but the strange thing is that when I blindfold myself, I'm free, and I want you to be free, too.

The only point in writing a question is to use clear, concise language.

It's fine in your head. If it's clear and concise, feel free to send it to me.

Please send your name along with your question.

Please send questions such as "My name is..." and "What's wrong with my feet?"

name and question

Someone sent it, right? It's the front seat. I can see your name clearly.

in front of the middle

Mr. Alan?

there must be someone like that

It's pretty far in the front, probably in the middle

I can feel it from there

A man in his early 60's

(Alan) Yes

(Darren) So you got a mic.

Say "stop" when I turn to you, I want to know which way

(alan) stop

(Darren) Are you a Capricorn? (Alan) Yes

(Darren) Guess Alan's question

I felt humble from your voice

This question seems to be quite difficult

say yes again

(Alan) Yes

(Darren) Probably- no, it's not.

Is it a way to connect to something or a password?

Answer yes or no Password?

(Alan) Yes

(Darren) A computer or something?

(Alan) Yes

(Darren) Alright!

(Laughter) So I'm going to guess.

Please change it later.

(Alan) Of course

(Laughter) (Darren) Again, "Of course." (Alan) Of course.

Darren: Well, I think it's a word. Visualize that password in front of you, in big, clear block capitals, and think about the letter in the middle. Don't say it out loud.

Did you do it? (Alan) Yes

(Darren) Keep it up

oh you changed

I would have put it in another letter

Are you thinking of - "B"?

(Alan) No

wrong

(Darren) Then "I"? (Alan) Yes

(Darren) It was a 'B' at first, right? (Alan) Yes

(Darren) You changed it along the way.

(Laughter) So keep looking at that letter.

repeat it in your head

Hey, do you play the drums too?

(Alan) hit

Darren: But don't think about the drums right now, just focus on this.

(Laughter) My job is to sell stories.

What I'm going to do is direct your attention to the things I want you to focus on and ignore the rest you don't want.

It's a complex and elusive world that we're entering. There are complex and elusive people like you and me, Alan.

It's just a story, and it's the same as thinking that I'm a mind-reader.

Alan, are you thinking of selling your company?

(Alan) Yes

(Darren) Are you a skin company?

(Alan) Yes

(Darren) Skin care?

(Alan) Right

CA: I love doing this because it reminds me to be more sensitive and attentive to complex and elusive realities. There's always something going on around me that I don't know about. If I'm more attentive, I can be more productive and kind to people, because I know there's always fear behind their stress.

a!

That was your password. Where's Mr. Alan?

(Alan) here

(Darren) Stand up. The password is ariboy.

Are you hitting? (Alan) That's correct.

(Darren) Thank you

(applause)

(Playing) (Applause) Hello everyone, I'm Sirena.

I'm 11 years old. I live in Connecticut.

(Applause) I honestly don't know why I'm here.

(Laughter) Because I don't know how the violin relates to TED (technology, entertainment, design).

If it's an iPod, or a cell phone, or a computer, I think it's technology, but the violin doesn't look like it.

so i did a little research

I will explain what I understand

It's a story if I remember correctly

The violin is in a wooden box and

It's got four strings, and the vibrations you make when you pluck the strings produce sound waves, and the sound travels through something called the bridge, into the wooden box, where it's amplified.

(Laughter) I just remembered that if you put your fingers in different places on the fretboard and change the length of the string, you change the wavelength of the sound.

Oh I can say!

(Laughter) Well, I don't think it's a kind of technology, but it's 16th century technology.

But what's interesting is that today's audio and wave transmission systems basically use the same principles to create sound.

Isn't that amazing?

(Laughter) (Applause) Design...I like this design.

When I was little, my mother asked me, which do you prefer, the violin or the piano?

Seeing that big monster-like thing, I thought, how can you be tied to a bench like that all day long?

sorry this one is small and light

Standing, sitting, even walking

And best of all —

You can hide it when you don't want to practice!

(Laughter) The violin is very beautiful.

Some say it resembles a woman's body

Love it or hate it, it's been like this for 400 years.

But violins are very individual, and although they all look very similar, no two violins sound the same, even if they're the same model and made by the same manufacturer.

Entertainment… I love entertainment

but the instrument itself

It's not fun. When I first picked up the violin and tried to play it, it sounded terrible and didn't sound like the other kids.

no fun at all

But my brother really liked it, yeah yeah yeah

(Laughter) Years later, I heard a funny story about the great violinist Jascha Heifetz.

After the concert, a lady came over and said, "Mr. Heifetz, your violin sounded great tonight."

Mr. Heifetz, who was very cool, picked up his violin and said, "Isn't that weird? I can't hear anything."

(Laughter) Now, as a performer, I finally understand that we humans have the great mind, the artistic heart and the skill to turn 16th-century technology and traditional design into great entertainment.

I finally understand why I'm here

(Playing) (Applause) At first, I thought I was just going to play here, but it turned out to be a lot of fun and I learned a lot.

Some were too difficult for me

(Laughter) Something like multidimensional.

If I can do 2D properly at school, I'm satisfied enough.

(Laughter) But what really struck me the most is, on behalf of all the children, I want to say thank you to all the grown-ups for caring about us and making the world a better place in the future.

thank you very much

(Applause) (Play) (Applause) (Play) (Applause)

I started getting interested in solar energy when I was 15.

That's when I moved from the snowy Fort Lee, New Jersey, to the scorching heat and gas lines of California.

In 1973 there was a gas quota

The energy crisis was going full speed ahead

I started reading "Popular Science" magazine, and I was excited about the potential of solar energy to help us out of this crisis.

In high school, I took a trigonometry class and learned that a parabola converges light.

very interested

I saw the potential to create light-gathering devices, so I started a company called Solar Devices.

I remember building parabolic reflectors there, taking metalworking classes, and building parabolas and Stirling engines in the workshop.

When I was working on the workbench, a motorcycle gang came and asked me, "Are you making water pipes?"

I said, "No, it's a Stirling engine," but they didn't believe me.

I put up a drawing of the engine and reflectors in the advert for Popular Science magazine, saying "$4 each", and I was able to make enough money to pay for my first year of tuition at Caltech.

I was so excited to get into Caltech.

I continued to work in my first year of college.

Grade evaluation started from the second year

In the first year, it was only pass or fail, but from the second year, there were stages

I couldn't keep working, and it ended up being a 25-year long journey, although I dreamed of harnessing solar energy at a practical cost.

I took a big detour, first studying at Caltech.

And then around the time I graduated, the IBM PC started coming out, and in 1981, I got hooked on it.

Lotus 1-2-3 came out in 1983, and I was blown away by it.

I used 1-2-3 to run my company, I wrote add-in software for 1-2-3, and I built a natural language interface for 1-2-3.

After I joined Lotus, I started an educational software company, and then I started an 'idea lab' so that I could start multiple companies in a row under one roof, much later, in 2000, it was rumored that there would be a major energy crisis.

The California energy crisis was approaching.

So I thought, is there a better way to do this? Could we build a device that would allow people to have backup energy when the crisis really hit?

So we started thinking about building a battery backup system that could last five hours, ten hours, one day, three days, as you heard earlier today.

Batteries are not as energy dense as fuel

Fuel can store much more energy than batteries

You can finally get 4 hours of battery backup with the whole garage square footage Check out other saveable energy technologies

For example, we came to the conclusion that flywheels and batteries with different principles were not practical.

Can't we make energy? may be made

I thought it might work with solar power

Now, 25 years later, I'd like to take a look back at what progress has been made in solar cells.

The price goes down from $10 a watt to $4 or $5 and stops there.

To be economical, it has to be much cheaper.

We studied the revolutionary things that happened to solar cells, and we looked for ways to modify them and make them cheaper.

There are a lot of ways in which we can do that, but they basically require a lot of energy during the manufacturing process.

Some people say that the amount of energy required to make a battery is more than the amount of electricity a solar cell will generate over its lifetime.

I think it would be more practical if we could reduce the energy needed to manufacture it.

But today, we make batteries by heating silicon in a 900-degree oven for 17 hours.

Many people are trying to reduce it, but I can't contribute in this area.

I struggled to find other ways to make it more economical.

What if we could use a large reflector to focus the sun's rays? With modern technology, it's much cheaper to make a large concentrator to focus the light into a small converter, so the converter wouldn't be very expensive, because it's smaller than a solar cell, which has to cover the entire surface to receive the sun's energy.

It seems practical. First, it's a new manufacturing technique.

Not to mention small, cheap motors, like brushless motors, servo motors, and stepper motors like those used in printers and scanners.

So were cheap microprocessors, of course, and an important leap forward was in the use of genetic algorithms.

In a nutshell, this is a powerful way to solve intractable problems with the logic of natural selection.

Problems that cannot be solved with pure mathematics are assembled into evolutionary systems, speculated through multiple trials, including the evolutionary role of gender, that is, halves of different solutions are combined to create new variants, and natural selection is used to truncate bad solutions, usually using genetic algorithms.

Using a computer with a 3GHz processor, you can solve problems that were previously unsolvable in minutes.

We tried to create a new type of light collector using a genetic algorithm.

let me show you

A conventional concentrator looks like this

These are parabolas

Focus parallel rays to a point

It tracks the movement of the sun because it always has to face the sun head-on, and it usually only has an acceptable angle of about one degree.

Any more than that and you're out of focus, so a collector that doesn't need tracking.

We've developed one that collects the sun's rays from a wide angle of more than one degree and has no moving parts.

So to test this idea, I used a genetic algorithm to build a model of a multifaceted reflector in Excel, and the amazing results literally evolved, after a billion iterations and trials, to a fitness function that could collect the most light from the sun at the widest angle in a day.

This is the finished shape

Each non-tracking concentrator, which has six tuba-like tubes, collects light in the following way: when light hits it, it bounces straight to the central hotspot.

Direct sunlight may reflect once, off-axis may reflect twice, and extreme off-axis may reflect three times.

Efficiency decreases with the number of reflections, as we lose 10% of the light per reflection, but this allows us to collect light from angles of +/- 25 degrees.

Two-and-a-half hours a day, we can now focus light on stationary components.

Solar cells collect light for four and a half hours

Because the sun traverses the sky on an average day, as the sun strays from its central axis, the cell's efficiency drops off in a sinusoidal fashion.

Collects an average of 4.5 hours of sunlight per day

It didn't have to move, it could reach high temperatures, but it wasn't enough, it had to beat the solar cells.

I tried other ideas

The method is to divide the parabola into single valves and have them track each.

12 single valves controlled by microprocessors for only $1 each.

You can buy a 2 MHz microprocessor for a dollar for a dollar

You can buy a stepper motor that rarely breaks because it has no brushes.

You can control 12 single valves for under $50. Now you don't have to move the focus, you just move the single valves.

This system is short, but it can collect six-and-a-half to seven hours of light a day.

Now that it is possible to collect light, what do you use to convert light into electricity?

I've studied the various heat engines that have been used to date, trying to convert light into electricity or heat into electricity, and the most effective and groundbreaking is the steam engine, invented by James Watt in 1788.

Watt didn't invent the steam engine, he just improved it.

But what's amazing about this improvement is the new linear motion guide on the piston.

He added a cooler to cool the steam outside the cylinder, modified it to a double-acting engine, and doubled the power, all the improvements he made.

It was a revolutionary breakthrough, so it's no surprise that the unit of energy became the watt after him.

I saw this engine and thought it had potential.

Steam engines are dangerous, and as we all know, they had a huge impact on the industrial revolution, ships, locomotives and the world.

They're not suited for the age of distributed power, because the bigger the better, and the higher the pressure, the more dangerous it is.

the other is a hot air engine

The hot-air engine wasn't invented by Robert Stirling either, but was radically improved by Stirling in 1816.

Hundreds of creative designs have been created over the years using this strange engine that runs on air instead of steam.

But after Stirling Otto presented an improved internal combustion engine which he exhibited in Paris in 1867.

And that's an important result: the power density of the engine is greatly increased, so you can get more power in a smaller space.

An engine applicable to locomotion was born

As they became more mobile, they could be used in more products, and the number of engines built increased. Steamships and factory engines were manufactured in smaller numbers, while internal combustion engines benefited from mass production that other engines could not.

Mass production reduced costs, 100 years of continuous improvement, reduced emissions, attention.

Hundreds of millions of internal combustion engines were built, but only a few thousand of Stirling engines.

Even fewer small steam engines were produced, mostly large engines for large industrial establishments.

After looking at these three and 47 others, I concluded that the Stirling engine was the most suitable.

I'd like to briefly explain how I did the research and how it works.

I wanted to take a new look at the Stirling engine, which is practical because weight doesn't matter anymore.

The reason the internal combustion engine has been so successful is because it's light and portable, but

Weight becomes almost irrelevant when it comes to generating solar energy at a fixed location.Another finding is that the energy source is free.

Efficiency is that you don't have to worry about it

Efficiency is important because the cost of fuel for the life of an engine usually exceeds the cost of the engine itself.

If fuel is free, only upfront capital expenditures need to be considered

We don't want efficiency, we want to maximize power per dollar, with this new mindset and standards.

So we revisited the Stirling engine, and then added a genetic algorithm to it, basically because Stirling predates Gordon Moore.

Couldn't use 3GHz processor power

So I took the genetic algorithm I used earlier and built a concentrator to make the best use of the Stirling engine, to get the most power per dollar, so I optimized the size and dimensions, and designed it so that it could convert as much of the sun's energy as possible, regardless of weight and size, because sunlight is free.

The simplest heat engine, or hot air engine, is a box and can combined with a piston.

If you heat the bottom with fire, the piston will rise.

When you put out the fire or pour water on it or let it cool, the piston moves down, and this is the heat engine.

is the most basic heat engine

The problem is that it's 1 in 100 percent efficient, because you're heating all the metal and cooling all the metal one at a time.

You can only get power from hot air, and the energy used to heat and cool metal is wasted, so a clever idea was born.

Instead of heating and cooling the entire cylinder,

What if we put something inside that moves the air back and forth, though it takes a little energy to move it?

Just move air between hot and cold poles Just move air between hot and cold poles

So it's not the metal that's heating or cooling the air.

This increased the efficiency from 1 in 100 percent to 2 percent.

Stirling had another genius idea: in an engine like this, you don't heat the metal, but you reheat the air, heating and cooling the air each time.

in the middle of the passage through which air flows between hot and cold

What if I put a heat-retaining sponge in it?

So he made a thermal sponge out of thin wire and glass and different materials.

When air is pushed from the hot pole to the cold pole heat is stored in the sponge

When the air comes down after being cooled, it picks up that heat again, so we're reusing the energy five or six times.

Efficiency was also increased by 30 to 40 percent

Stirling's little-known but brilliant invention that transformed the hot-air engine from something that wasn't very practical -- a simpler version I thought it was when I was in high school -- into something that had a lot of potential once it was more efficient once it was less costly.

We tried to keep costs as low as possible.

We built a big mathematical model of how the Stirling engine works, and we incorporated a genetic algorithm into it.

From there, we came to the conclusion to create the optimal engine.

We built 100 different types of engines in two years, measured each one, and adjusted them accordingly.

We've reached the prototype we have today.

Here's the engine, let me show you what it actually looks like.

This one

This is the hot cap, the hot cylinder is on top, this part gets hot, this part gets cold, and the electricity comes out of here.

vice versa

When electricity is passed through, this part heats up and this part cools down, creating a cooling effect.

Fully reversible, efficient cycle, easy to make.

Put those two things together and you have an engine.

What if we combined the single valve with the central engine?

A single valve tracks the light, and the engine receives the collected sunlight and converts the heat into electricity.In the middle is the single valve and the engine.

The prototype looks like this, I ran it in the sun.

I would like to show you the real thing

<Applause> Thank you. This device has 12 single valves.

They cost about $1 each and are made of lightweight molded plastic with an aluminized finish.

Underneath this is the control panel for each single valve, each with its own microprocessor.

The engine has a thermocouple, which is a small sensor that detects the temperature rise when light hits it.

Each single valve can be adjusted to maintain maximum temperature at all times.

When the sun rises in the morning, the single valve looks for the sun for maximum temperature.

In a minute and a half or two when the light hits the hot cap, the engine reaches start-up temperature, and the engine produces electricity for about six-and-a-half to seven hours a day as the sun moves over it.

It's a cheap microprocessor, each single valve is independent, and each can find the sun without any setup.

You don't have to indicate the latitude and longitude where you're located, the slope of the roof, and the orientation.

irrelevant

You just look for the highest temperature, and after half an hour, then after a day, then again after a month.

Locating is self-aware of the direction the sun is moving, so you don't have to do anything about it.

The engine kicks in, power comes from here, AC, DC, and some appliances.

You also get 12 Volts DC

The inverter gives me 117 volts AC and I can boil water.

hot water is optional

There is no need to use hot water, it cools naturally.

If you use the heat you give off to heat water, you can be much more efficient, because you're using some of the heat that you would normally waste, whether it's a swimming pool or a hot water bath, as useful energy.

This is the first outdoor test I've done, and you can see that each single valve is detecting.

Search broadly and carefully at first

When a temperature reading appears on the thermocouple indicating that we've found the sun, we slow down and search more closely.

Once all the single valves are in position, the engine starts running. I've been building this piece of equipment for the past two years.

I'm very excited about the progress, but there's still a long way to go.

I'd like to talk a little bit about the long way to go. Here's a sketch of a residential installation, and I think you can have more than one on your roof -- on your roof, in your garden, anywhere.

You don't have to buy enough appliances to power your entire home, and you save money by installing them.

This type of application uses the grid as a potential backup energy source, and of course it cannot be used at night and on cloudy days.

It's complementary in that sense, because it reduces energy usage during peak times when you typically use things like air conditioning.

So that's how I envisioned how a home could be used, especially in a remote location with lots of sunny days in the energy business.

i think it has a lot of potential

These two factors make for a great combination, and that's because there are places in the world where the sun is intense.

A special place where you can put this piece of equipment at a low price, and where there's a lot of wind.

As an example, this is a map of the United States

Most of the parts other than green and blue are good.The green and blue parts are not bad, but they are not as good as the red, orange and yellow parts.

Surrounding areas such as Las Vegas and Death Valley are very suitable

It's not that you can't use solar energy, it just affects the payback period, it can be used anywhere on the planet.

The payback period is affected compared to the electricity supplied from the grid, but in the absence of grid feeding

The payback period issue is quite different Watts you get per dollar

And it has to do with the life changes that come from using this power.

Here's a map of the United States, a map of the world, and there's a huge band in the middle, and it's a large, populated area, and it's a huge potential for solar energy.

look at africa

There's an incredible potential for harnessing solar energy out there, and I'm honored to talk to you about what we can do.

The last thing I would like to say is that when old ideas are shone in a new light, sometimes abandoned ideas of the past become practical with new technology and ingenuity.

I'm pretty sure we're getting close to something that's practical and affordable.

The short-term goal is to halve the price of solar cells, and the long-term goal is to reduce the amortization period to five years or less.

If the amortization period is within 5 years, it will become economical at once.

Better not buy these for charity

it makes sense economically

Today's solar installations have an amortization period of 30 to 50 years.

If you can get it down to five years or less, it simplifies the decision, because if there's a benefit to owning it, it's easier to borrow money, and you can start making money right away.

So that's the real goal we're aiming for in business, and two other things that I learned that really blew my mind.

One is that we're indifferent about energy.

If you walk here from the elevator and just look at the stage, you're probably using 20 500-watt lights.

About 10,000 watts are used in stage lighting, and one horsepower is 756 watts at full power.

So you have 15 horses running full speed just by lighting the stage.

Not to mention 200 horses running to run the air conditioner, and it's amazing to walk into the elevator and have the lights on inside.

Of course I

Now we're more sensitive to leaving lights on in our homes, but energy is so cheap around here.

It's used insatiably. The cheap ones are condensed sunlight.

Because it's aided by energy, and oil is a concentrated form of solar energy.

It took a billion years to get the energy by being bombarded with an enormous amount of energy.

I don't think we have a birthright to use it up as quickly as possible, to create energy as fast as we use it.

Thank you for your attention.

<applause>

At some point in their lives, most people who have sex become infected with the human papillomavirus, or HPV for short. There are more than 100 types of HPV, and most of the time, the body eliminates the virus without causing any symptoms, but some pose serious health risks later in life.

HPV is transmitted by contact, so rather than spreading the virus throughout the body, it lies dormant in cells near the site of infection.

Since HPV is most often transmitted sexually, the usual routes of infection are the vagina, vulva, penis, anus, mouth and pharynx.

We can test cells in these areas for HPV, but even if it's scientifically possible to test for the presence of the virus, it's not common.

The main reason is that while there are treatments that reduce the negative health effects of HPV, there are no treatments that kill the virus itself.

So if you do an HPV test, you'll probably get a lot of positive results, most of which are not alarming, but there's no treatment plan yet that will clear the body of the virus.

There are better ways to protect yourself from HPV

Let's take a look at how HPV can harm you, who's at risk, and how you can limit the risk.

The body's immune system can kill most types of HPV before they can harm the body, so the infected person doesn't even know they're "infected."

Certain other types, such as HPV types 6 and 11, can cause abnormalities in the cells of the infected tissue, resulting in genital warts.

These are contagious and usually require topical treatment, but the type of virus that causes warts doesn't cause long-term harm.

But 13 other types cause mutations in DNA that cause cells to divide much faster than normal, leading to cancer.

Cells in the cervix are particularly at risk.

There are two causes: HPV types 16 and 18 are responsible for the majority of cervical cancers and are the fourth most common type of cancer in women.

Cancer can take up to 20 years to show symptoms, but regular checkups can detect abnormal cells in the cervix before they develop into cancer.

Women over the age of 21 can have a regular Pap test, which involves scraping tissue from the cervix to check for abnormal cells.

A positive test does not mean that you have cervical cancer, it just means that you have abnormal cells in your cervix that could develop into cancer in the future.

Follow up with more frequent Pap tests after that, or colposcopy (cervical cancer work-up) for more serious abnormalities.

In this test, a doctor examines your cervix through a microscope and takes a biopsy to see more details.

It can also remove damaged cells

An HPV-infected throat can lead to cancer of the head and neck, but there is currently no equivalent pharyngeal test to the Pap test.

Using condoms during sex prevents the spread of HPV

There are three vaccines that are safe and effective, all targeting HPV types 16 and 18.

Vaccines are given in two or three doses at intervals of several months, but they are not effective unless they are all taken.

Vaccination is now the standard of care for girls aged 11 to 18 in many countries, but it is becoming more widely available for boys as well.

Adult women and men in countries including the United States and the United Kingdom can choose to be vaccinated, and data show that vaccinating both women and men could reduce global cervical cancer by about 90 percent.

Researchers are developing injections for people infected with HPV types 16 and 18 that target infected cells and stop them from developing into cancer.

While there is room for improvement in screening, treatment, and access to each, condom use, vaccines, and cervical screening can each reduce the health hazards of HPV.

Ireneo Funes said to the glass of wine on the table, "I saw all the buds and bunches and berries of the grapes.

He remembered the shape of the southern clouds at dawn on April 30, 1882, and was able to compare it with the marble pattern in the ornamentation of the leather-bound book, which he had only seen once in his memory, and with the streaks of water sprayed by oars on the river Negro on the eve of the Battle of Quebracho."

This person not only remembers everything he sees, but he remembers every minute he saw it.

Overwhelmed by such details, Funes spent the day in a dark room, having to imagine a corner of a town he had never visited in order to sleep.

According to Borges, the memory of Funes made him unable to even think: "To think is to forget differences, to generalize, to abstract.

In Funes' overfilled world, there were only details." Funes' infinite memory is just one example of Borges' infinite quest.

Born in Argentina in 1899, he followed in the footsteps of his reading father, admiring the revolutionaries of his maternal family.

His body of work, including essays, poems, and stories he calls "legends," pioneered a literary form known as "magical realism," each of which consisted of only a few pages.

Borges wasn't interested in writing novels, but he was an avid reader and had friends read to him after he lost his eyesight in middle age.

His image of paradise is an endless library, depicted in "The Library of Babel," where there are countless similar rooms, each containing the same number of books of the same length, and the Library of Babel is itself a universe.

It contains all possible writings, some masterpieces and countless total nonsense.

The narrator spends his entire life wandering this vast labyrinth of information in a perhaps fruitless quest for meaning.

The labyrinth appears repeatedly in Borges' work.

In "Yamata no Sono," Yusung navigates winding country roads as he recalls stories of his ancestors' lost labyrinths.

Through the story he learns that the labyrinth is not a literal labyrinth, but a novel.

The novel reveals that the true Garden of Eight Branches is time, with an infinite number of possible actions at every moment.

One moment is followed by another, and each possibility gives rise to a series of diverging futures.

Borges depicted the infinite expanse of time in the labyrinth, but he also pursued the idea of ​​all time converging into one point.

In The Book of God, at the beginning of the world, God wrote a message on the jaguar's spots, and then, "The jaguars mate and breed endlessly in caves, millet fields, and islands, so that the last man could receive the message."

Trapped deep underground, he has no one to talk to, and his situation doesn't change, but he doesn't care.In that moment, he experienced the experiences of everyone who ever existed.

Reading Borges may give you a glimpse of infinity too.

Last week, I wrote a letter to inform you about the work of the Bill & Melinda Gates Foundation and some of the problems associated with it.

Warren Buffett advised me to write an honest account of what went well and what didn't go well with my foundation activities, and to write something like an annual report.

My goal was to get more people involved in solving problems. Because I think there are some important problems that will not resolve themselves.

In other words, the market does not encourage scientists, media, philosophers, and governments to act appropriately.

So it's only through good people who care about important issues and involve other people in problem solving that we can make as much progress as we need.

This morning, I'd like to take up two of those key issues and tell you the current state of them.

Before I get into them, let me tell you that I'm an optimist.

Any problem, I believe I can solve it.

One of the reasons I feel this way is because I look back.

Over the past 100 years, human life expectancy has more than doubled.

Another statistic, which is probably my favorite, when you look at infant mortality.

Around 1960, 110 million children were born, 20 million of whom died before the age of five.

Five years ago, more than 135 million children were born, less than 10 million of whom died before the age of five.

This means that infant mortality has been cut in half.

This is amazing.

Each of those lives is irreplaceable.

Beyond rising incomes for people, there have been some important breakthroughs that have helped reduce the number of deaths. It is the spread of vaccination.

For example, the number of deaths from measles (a rash disease) has dropped from 4 million around 1990 to less than 400,000 today.

So change is really possible.

The next step is to cut the 10 million infant deaths by half again.

I think that it will be realized without waiting for 20 years.

This is because most of those deaths are caused by just a few diseases. diarrhea, pneumonia, and malaria.

This brings us to our first challenge this morning: how do we prevent deadly diseases spread by mosquitoes?

First, looking back at the history of malaria

It has existed for thousands of years as a very dangerous disease.

In fact, if we look at the genetic information, we can see that malaria is the only disease where people in Africa have actually evolved several times to avoid death.

Malaria deaths peaked at just over 5 million in the 1930s

It was truly a sickness.

In addition, malaria is spreading all over the world

It was a terrible disease. It spread throughout the United States and Europe.

No one knew the cause of malaria until the early 1900s, when a British soldier figured out that it was caused by mosquitoes.

Therefore, it was prevalent everywhere.

Two measures have helped reduce mortality from malaria.

One is to get rid of mosquitoes with DDT (insecticide).

Another was treatment with the wonder drug quinine, or its extract.

It actually reduced the mortality rate.

But, ironically, what happened was that all of the temperate regions where the rich countries are located have been malaria-free.

Looking at the infection map, 1900 exists all over the world.

Even in 1945, they are still around the world.

By 1970, it had been eliminated in the United States and most of Europe.

In 1990, it has been removed in most districts in the north.

Looking at the recent situation (2009), the infected area is only around the equator.

This creates the paradox that malaria only occurs in poor countries and not enough funding is available to eradicate it.

For example, more financial investment is being made in hair thinning drugs than in malaria control.

Well, I hate baldness.

(Laughter) And wealthy men struggle with that.

Therefore, priorities are set there.

However, even though malaria kills millions of people each year, its impact is seen as rather small.

Over 200 million people suffer from malaria infections at any given time.

This means that it is difficult to turn the economy of infected areas because there are many challenges to overcome.

Of course, malaria is spread by mosquitoes.

I have brought some mosquitoes so that you can experience it.

Now, in the auditorium, let's let it go for a moment.

(Laughter) Because it doesn't have to be experienced only by the poor.

(Laughter) (Applause) This released mosquito is not infected.

I came up with some new ways to hang mosquito nets.

This is a great tool.

It means that the mother and child can sleep under the mosquito net without being bitten by mosquitoes. No more mosquito bites in the middle of the night like before.

Using indoor insecticides and hanging mosquito nets can reduce mortality by more than half.

This is already being done in many countries

It's a pleasure.

But one thing to be careful of is that as the parasite, the malaria parasite, evolves, so do the mosquitoes.

In other words, the means that were useful in the past will eventually become less effective.

Ultimately, we come to two options.

One is to thoroughly use appropriate means and methods in infected countries to eradicate infection.

This is the area where the map of malaria transmission is getting smaller.

The other method is to use half-baked countermeasures, and even if they are temporarily effective, they will gradually lose their effectiveness and invite a rise in the mortality rate again.

People's interest levels have also changed over time.

Now people's interest is greatly increased.

More funding for mosquito nets

New drugs are being discovered.

The vaccine that our foundation supports will go through a third trial in a few months.

If it works, more than two-thirds of the infected will be saved.

Even with these new means

That alone will not give you the desired results.

Eradicating malaria involves many things.

First of all, the media needs to provide a large amount of funding and tell many people about success stories.

Sociologists can help us understand how to increase bed net coverage from 70% to 90%.

We need mathematicians to come in and simulate these tools, to understand how these tools fit together and how they work.

Of course, it also requires the expertise of pharmaceutical companies.

We also need generous and generous support from the governments of rich countries.

By integrating these elements, I am optimistic that malaria can be eradicated.

Now let's move on to the next task. The issues are quite different, but comparable in importance.

It is a method of training high-quality teachers.

It seems like a problem that I spend a lot of time working on on a regular basis, and I tend to think that everyone understands it very well.

Actually, not at all.

First of all, let's talk about the importance of this challenge.

I am sure that all of you who are here have had the experience of meeting wonderful teachers.

And all of you have had a wonderful education.

That is why we are here today. It's one of the reasons for our success.

I'm a college dropout and that applies to me too.

I have met wonderful teachers.

In fact, the education system in the United States is doing pretty well.

Within a narrow circle, there are teachers who are very effective.

Therefore, 20% of the student population has a very good education.

20% of them are among the best in the world, even when compared to the top 20% of the best in other countries.

Its best talent has revolutionized the software and biotechnology sectors, keeping the United States at the forefront.

Currently, however, the strength of the 20% of top talent is beginning to show a relative decline. However, what worries me more than that is the education that the remaining 80% are receiving.

It has always been inferior, and it is getting inferior.

In the economic world today, the chances of success are only given to those who are well educated.

This trend must change.

It has to change so that everyone gets a fair chance.

By bringing about change, we can strengthen our national strength and position our nation at the forefront in science and mathematics and other fields driven by higher education.

When I first saw these statistics, I was stunned by the severity of the situation.

Currently, more than 30% of the student population has not graduated from high school.

This fact remained hidden for a long time. This is because the high school dropout rate was calculated by comparing the number of people who started their final year with the number of people who completed it.

There had been no investigation into the situation of the students prior to that time.

Most dropouts occur before the final year of school.

Therefore, as a result of re-examining the survey, we had to raise the dropout rate to over 30%.

For non-white students, the dropout rate is over 50%.

What's more, even if you graduate from high school, if you're in the low-income bracket, your chances of getting a college diploma are less than 25 percent.

In the United States, low-income people are more likely to end up in prison than earn a four-year college degree.

I don't think it's fair at all.

How can we improve the quality of education?

Our foundation has been investing in this issue for the past nine years.

Many people are working on this issue.

We have reached out to small schools, provided scholarships, and entered the library business.

Many of these efforts have had a positive impact.

But the more I looked at the problem, the more I realized that having good teachers was the most important key.

So I decided to work with some researchers. They were looking at how much difference there was between teachers, the top quartile of teachers, so to speak, and the bottom quartile.

What are the differences within and between schools?

The difference in results was absolutely incredible.

Teachers in the top quartile increase test performance for their entire class by more than 10% in one year.

what does this mean

For two years, if all students in the United States were educated by teachers in the top quartile, the gap that currently exists between the United States and Asia would disappear altogether.

And within four years, it means that we will be the top of the world, far ahead of the rest of the world.

It's easy. What we need are teachers in the top quartile.

"That's good. Reward those teachers,

keep hiring them

We should explore their teaching methods and pass them on to other teachers.”

Right now, things are not going in that direction at all.

What are the characteristics of teachers in the top quartile?

What kind of people are they?

An experienced older teacher, you might think.

The answer is no.

Once you have 3 years of teaching experience, no matter how many years you teach after that, the quality of teaching will not change.

The changes are only minor.

Or you might think that they are people with master's degrees.

I think he went back to college and got a master's degree in education.

This graph shows the relationship between four factors and the quality of teaching.

The factor listed at the bottom that has no effect on the quality of teaching is having a master's degree.

The current payroll system rewards you for two things:

The first is about seniority.

This comes from the fact that salaries increase with age and can be contributed to pensions.

Secondly, there is a special reward for master's degree holders.

However, there is no connection between obtaining a master's degree and being a high-quality teacher.

The popular "Teach for America" ​​program has had little effect.

Mathematics teachers with master's degrees have a predictable effect

But overwhelmingly past experience speaks for itself.

There are people who are very good at teaching.

However, nothing is being done to raise average ability or keep teachers stuck in the education system by studying, adopting, and imitating effective teaching methods.

As for saying "Are the good teachers stopping and the bad teachers quitting?"

The answer is that good teachers who are slightly above average are quitting.

The education system has a very high turnover rate.

However, there are places where good teachers are being developed, albeit very limitedly.

A good example of this is a public school without a curriculum called KIPP.

KIPP means "knowledge is power".

It's an incredible school.

Most of the 66 schools are junior high schools, but there are also a few high schools that offer excellent education.

The school accepts the poorest children, but more than 96 percent of its students graduate from high school and enroll in four-year colleges.

The motivation and attitude that prevails in this school is completely different from that of ordinary public schools.

Two or more students are in charge of each subject, and efforts are constantly being made to improve the quality of the teachers.

Collect data and test results and report to the teacher, "You improved your results this much."

We are deeply involved in improving the quality of teaching.

In fact, when I visited a class at that school, I felt very strange at first.

I sat in my chair and thought, "What the hell is going on?"

Because the teachers were running around and it was very lively.

I thought, 'Is this a sports game preparation or something?'

"What's going on?"

Teachers constantly find inattentive or bored students and call them in at a dizzying pace to write their answers on the blackboard.

It was a very dynamic environment. This was to keep the attention and focus of the students, especially in grades 5 through 8, which is middle school. It creates an environment where everyone in the class can't help but pay attention, make fun of someone, or be indifferent to the lesson.

Everyone is required to attend class.

KIPP does that.

What is the normal school situation for this school?

First, in ordinary schools, teachers are not informed about the success or failure of their teaching methods.

Such data have not been collected.

Faculty contracts limit the number of classroom visits the principal can make, sometimes limited to once a year.

In addition, advance notice is required for visits.

Just imagine. It's like a worker who makes a lot of junk in a factory and says to the factory manager, "I can only visit the site once a year, but please let me know when you come. I'll do a little good job and only then will I cheat."

Some teachers want to improve their teaching, but they don't have the means to do so.

We don't have the test results and there are big ones trying to block that data.

For example, New York passed a law prohibiting data on teacher quality improvement from being made public or used to determine teacher tenure.

It's moving in the opposite direction of what it should be.

But I am optimistic about this. I think it's pretty clear that some things we can do.

First of all, there are a number of tests currently being carried out that give us an idea of ​​where we stand.

Then, based on the results, it is possible to find out who is teaching well and bring those teachers to learn their skills.

Of course, digital video is cheap now.

Installing several video cameras in the classroom and continuously filming the lessons is a very practical practice in all public schools.

And then every few weeks the teachers get together and say something like, 'This is something I thought I did well.

This is where things went wrong.

How should I have dealt with this student when he made a fuss? "and

Teachers can work together to solve these problems.

By choosing the best teachers and understanding them in a commentary way, everyone can know who is the best teacher in each field.

Students can freely watch and learn from these excellent classes, such as physics classes, by selecting them and making them public.

If you have a student who is stumbling, you can make it homework to watch the lesson video and have them review the way of thinking.

In fact, if these free lecture videos are not only available on the Internet, but also on DVD, anyone with a DVD player can learn from the best teachers at any time.

By capturing this as part of the personnel system, more effective education becomes possible.

There is a book written about this KIPP activity. It's a book called "Work Hard, Be Nice," by news reporter Jay Matthews.

It was a wonderful book.

It simply tells us what a good teacher does.

This book will be distributed free of charge to everyone in the audience.

(Applause) We've invested heavily in education, but I believe that education reform is paramount to the strong future that this country should have.

In fact, one of the stimulus bills submitted by the House of Representatives included, interestingly, the introduction of a data system to improve the quality of education, but it was rejected by the Senate. This is due to the existence of people whose position is threatened by the introduction of this system.

But I am optimistic.

People are gradually realizing the importance of education. Done in the right direction, it can change the lives of most people.

I've only had time here to talk broadly about two issues.

Many of these problems still exist. AIDS, pneumonia... Just hearing these names, you can tell everyone is getting excited.

Solving these problems requires a wide range of skills.

As you can see, the social system does nothing if left alone.

Nor can the government itself steer these issues in the right direction.

The private sector does not voluntarily put financial resources into these projects.

So it's up to bright people like you here to study these things and get others involved in solving the problem.

I believe that this will bring great results.

Thank you for your attention.

(applause)

It's an incredible discovery: an ancient, abandoned alien space station is a treasure trove of pioneering technology.

But now every race in the universe is desperate to be the first to arrive here to claim ownership.

So you immediately face a problem

Your spacecraft, which flies faster than the speed of light, consumes one unit of fuel for every parsec (3.26 light-years) traveled, but your spacecraft can only carry 15 units of fuel.

But the space station is 23 parsecs away, and there's an empty void stretching from where you are to the space station.

But there's one thing we can do: dark matter fuels are stable in deep space.

So you can unload the fuel from the fuel tank, store it at some point, and then come back to pick it up later.

Your spacecraft can only carry 15 units of fuel, but you've been given permission to use all 45 units of fuel in your current location.

If you could strategically store fuel somewhere along the route, you might be able to fly 23 parsecs.

How can we get to an alien space station?

3 seconds to answer 2 seconds 1 second

You can solve this quiz using just two storage points, but there are other solutions with more storage points.

No matter how you do it, the key point is to precisely locate the storage point along the way.

Let's look backwards from the side of the alien space station.

In order to reach the 23rd parsec, the fuel tank must be full when leaving the 8th parsec.

It's too far from the starting point to make the 8 parsec point an immediate storage point. We can fly there, but we don't have enough fuel to get back to the starting point.

So we need to establish a storage point somewhere between the starting point and the 8th parsec.

but where?

We find interesting patterns that help us solve problems.

We have exactly three tanks of fuel at the starting point.

At the 8 parsec point, you only need one tank.

So is there an "X" point where you can store exactly two tanks?

It's going to be useful there, because you're refueling exactly twice, and you're using the full storage capacity without wasting it.

No matter where X is, there will be two forward flights: one to dump the fuel at the 8th parsec, and the second to embark on a journey of no return.

So we go back and forth between point X and 8 parsecs a total of 3 times.

So if you have 2 tanks at X and you need 1 tank at 8 parsecs, you can use 1 tank or 15 units of fuel to go back and forth between the two.

If you divide 15 units by 3, which is the number of flights, you get 5 units per flight, so you can set those two storage points 5 parsecs apart.

If we move further away, we'll run out of fuel to get to the space station.

So if we set the X point to the nearest point from the starting point, it will be the 3 parsec point.

Can you carry 30 units of fuel here? let's do it

We will depart with a full tank of 15 units.

You fly 3 parsecs, you unload 9 units at the storage point, and you fly 3 parsecs back, and the tank is empty.

If you repeat this process, you'll have 18 units of fuel at the storage point, and if you fly again, you'll have 30 units of fuel at the 3 parsec point.

So far so good!

Then fly to the 8th parsec, unload 5 units of fuel and return to the 3rd parsec.

Fill the tank and fly forward again with 10 units of fuel left in the tank.

The end is in sight

Take in 5 units of fuel stored in deep space, fill up the tank, and enter the location information of the final destination.

After 15 parsecs, it runs out of gas, but it's ready to dock with the pioneering space station.

It's time to put alien technology to work and enrich the lives of everyone in the universe.

I'm a storyteller, but I'm also a troublemaker.

(Laughter) And I have a habit of asking embarrassing questions.

It all started when I was 10 years old, and my mother, who was raising six children, didn't have time to care.

At the age of 14, to make matters worse, my mother was fed up with my vexing questions, and she suggested that I write an article for my local English-language newspaper in Pakistan, so that I could pose the question to people all over the country.

(Laughter) At 17, I became an undercover investigative reporter.

I don't think even the editor-in-chief knew I was that young when he humiliated some powerful people by naming them in an article I wrote.

Let me remind you of the men I hoisted in my articles.

trying to humiliate me and my family

All over the gate of my house, and even next door, I spray-painted unspeakable swear words along with my name and my family's name.

He must have thought that my father, who was a strict man who respected tradition, would discourage my words and actions.

But my father stood in front of me and said, "If you tell the truth, I will stand with you, and the world will do the same."

And then my dad -- (Applause) got everyone together and painted the walls white and erased the graffiti.

(Laughter) I've always wanted my stories to sway people, to inspire people to have difficult conversations.

I've come to believe that visual representations are more effective for that.

So at the age of 21, I became a documentary filmmaker, turning my camera to frontline marginalized people in conflict zones.

200 million people live in pakistan

For a country with a low literacy rate, movies have the potential to change the way we look at social issues.

A good storyteller appeals to our emotions, inspires empathy and compassion, and transforms our perspectives.

In my country, movies have the potential to go beyond entertainment.

can change people's lives

There's a problem I've always wanted to address -- I've always wanted to face society -- and the anger barometer drives me to track it down.

In 2014, that anger barometer led to honor killings.

"Honor killings" are happening all over the world. It's a custom to punish women who break rules set by men.

In other countries, honor killings are just murder.

I've always wanted to tell this story from a survivor's perspective.

But usually the female victims don't live to tell their stories, and instead are placed in an unnamed grave.

One morning, I was reading the newspaper, and I read about a young woman who miraculously survived being shot in the face by her father and uncle for marrying the man of her own choosing.

Saba was determined to send her father and uncle to prison, but when she was released from the hospital, she was pressured every day to forgive them for what they had done.

In fact, there is a loophole in the law where the victim can forgive the perpetrator and the perpetrator can avoid jail time.

She was told that if she didn't, she would be ostracized, and her family and in-laws would be marginalized from society.

She kept fighting - for months -

But on the final day of the trial, she made a statement that she had forgiven her assailant.

It was a big disappointment for us filmmakers.

Now that I think about it, even if she had filed charges and fought in court and won, her case would have been the exception.

If even a woman of such strong convictions can be silenced, what chance do other women have?

So we wanted to use this film to change people's perceptions of honor killings and close the loopholes in the law.

Later, the film was nominated for an Academy Award, and "Honor Murder" made the headlines when the prime minister offered to host the first screening at his residence, along with congratulations.

Of course, I jumped at the opportunity, because never before had a prime minister in this country made such an offer.

The Prime Minister's remarks at the preview, which was broadcast on national television, caused a nationwide reaction: "There is no honor in honor killings."

(Applause) At the Academy Awards ceremony in Los Angeles, many pundits said they expected no chance of winning, but they thought winning was necessary to continue demanding changes to the law.

And then my name was read out, and I ran onto the stage in my rubber sandals -- I never thought I'd be on stage.

(Laughter) When I received the Oscar, I told the billion people watching the broadcast that the Prime Minister of Pakistan had promised to overhaul the law, because if he said that, I wouldn't be able to back down as Prime Minister.

(Laughter) And then -- (Applause) Back home, the news of the award was dominating the headlines, and more and more people wanted to join our cause and demand that we close this legal loophole.

And in October 2016, after months of campaigning, the legal loophole was officially closed.

(Applause) Now, a man who kills a woman in the name of protecting his honor is sentenced to life in prison.

(Applause) But the day after that resolution, another woman was killed for honor, and the same thing happened over and over again.

Our work changed the law, but it wasn't enough.

I needed to take this film and its message with me to the small towns and villages of this country that are at the heart of the problem.

I believe that cinema can play an important role in shaping and changing society in a positive way.

But how do you get there?

To such a small town or village?

So we built a mobile cinema, and we've got trucks that go around the country, north, south, east, and west, stopping at small towns and villages.

The truck had a big screen that lit up the night sky, and we named it "Look at me with love."

This creates an opportunity for people in the community to gather to watch movies at night.

I knew that men and children would be fascinated by mobile cinemas.

they will come and see the movie

But what about women?

How can women be recruited in small rural settlements where women live segregatedly?

To do that, we had to take into account existing social norms, so we built a screening room inside this movie theater, with seats and a screen so that women could watch movies inside without fear, without being embarrassed, without being harassed.

We started introducing films that open minds to conflicting worldviews, encouraging children to think critically and question things.

Our coverage expanded from honor killings to discuss issues of income inequality, environmental issues, ethnic relations, and religious tolerance and understanding.

Inside, the screening room showed women films that portrayed women as heroes rather than victims, taught them how to navigate the justice and criminal systems, educated them about women's rights, taught them where they could flee if they were victims of domestic violence, where they could go for help.

We were surprised at how welcome we were everywhere.

Many towns had never seen television or social media and had a strong desire to educate their children.

Of course, there were resistances and negative reactions to the ideas we were presenting.

Two members of the mobile cinema resigned after being threatened by villagers.

In another village, I was having a screening and was interrupted because I didn't want the women in the village to know about women's rights.

But there were other examples of the opposite. In other villages where the screening had been interrupted, plainclothes police intervened and ordered it to be put back in place, and during the screening, I explained to everyone that it was my job to guard our team and to expose young people to a different world and to think about this issue.

he is an everyday hero

In fact, as we traveled, we met many everyday heroes.

In other towns, when the men said that only men could watch movies and women had to stay at home, the community elders stood up, brought people together and had a discussion, and it was decided that both men and women could watch movies.

we record this activity

talk to people

correspond to the situation

We also change the content of the films we show.

People who have been in prison for violent behavior show movies about it to men because they want them to realize that violent behavior always has consequences.

At the same time, I want you to watch films about men who protect women, because I want to encourage them to take on those roles.

We show women films about women in positions of head of state, lawyers, doctors, leaders, and encourage them to aspire to such positions.

What we're doing is changing the way people interact in our villages, and we're taking what we've learned there and taking it to other places.

Just recently, we were approached to bring our mobile cinema to Bangladesh and Syria, and we're sharing what we've learned.

I believe that spreading our activities around the world is very meaningful.

In Pakistan's small towns and villages, the way men treat women is changing, and the way children see the world is changing, village by village, with the power of cinema.

thank you

(applause)

I'm a writer-

writing is more than a job

I've always been passionate about-

This will not change in the future

Having said that, I recently had a strange experience that made me rethink the way I approach my work, both professionally and personally.

I recently wrote a memoir called "Eat, Pray, Love." It's clearly different from my previous work.

As a result, everywhere we are now, we're treated as people who have run out of luck.

It's really over

Everyone looks worried and says, "Aren't you worried that you can't overcome that?"

"Don't you feel anxious?" "I'll keep writing for the rest of my life."

well that's encouraging

I have a much worse experience. Over 20 years ago, when I was a teenager, I said, "I want to be a writer."

"What if it doesn't work?"

"Can you bear the humiliation of being rejected?"

"Keep writing for the rest of your life—" "Nothing is complete—" "My mouth is filled with the bitterness of failure—" "Even if I drown on the wreckage of a mountain of broken dreams?"

(Audience laughs) It was like that

The answer to these questions is simply "yes"

Of course I'm worried

always anxious

There are a lot of scary things, some things that other people don't understand... seaweed, etc. It's scary.

But when it comes to writing -- I've been thinking a lot lately, does it make sense?

Do what you think is a vocation—

What is taken for granted to be afraid?

What makes the creative world different is that it takes care of your mind, which is not often the case in other professions, is it?

My father was a chemical engineer, and in my 40 years there, I don't recall anyone ever asking me if I was worried about my job.

"Recently the chemical technology slump is okay?"

Impossible, right?

Chemical engineers, though, have been free from the rumors for centuries.

(Audience laughter) It's something that comes with being a writer, no, in the whole creative industry, they're known for being mentally unstable and --

The horrific death toll shows just how many great creators died prematurely and committed suicide in the 20th century alone.

Some people were killed by their talent, not by actual suicide.

Norman Mailer said when he was alive, "It's slowly killing me."

It's an unusual way of thinking about your life's work, but-

It shouldn't surprise anyone, because it's a story we've heard for years, so it's taken for granted that suffering is inherent in creation, and that artistry always ends up hurting.

Today's proposal is here Do you think this is good?

Don't you think it's weird?

Even if I think about it...?

Abominable—

It's a dangerous idea, I don't want you to leave it for the next century

Shouldn't we rather encourage them to continue living?

Given my situation, I can see that it would be dangerous to accept that dark premise, especially given my current situation...

I mean... this way- I'm still young, I'm in my 40s

I may continue my work for another 40 years.

Anything I'm going to write from now on will definitely be compared to the book I just published, which sold incredibly well...

Between you and me, frankly, I don't think I'll ever be able to write a masterpiece.

Oh my god!

If you think about it this way, people start drinking gin at 9:00 a.m. Sorry about that.

(Audience laughs) I want to keep doing what I love.

So you think, "How?"

I looked back and thought about what I had to do to keep writing -- to create something psychologically protective.

To be able to maintain a safe distance between me as a writer and my concern about the evaluation of future works...

Throughout the last year, I've been searching for examples, going back in time, going back in time, looking at different societies, looking for better, more just ideas, helping creators, managing the psychological risks that come with creating...

was in ancient greece and rome

Please follow me, I'll be right back

The ancient Greeks and Romans didn't believe that humans were endowed with creativity.

Creativity is the spirit that accompanies man - it came from far and unknown, from motives beyond human comprehension...

The ancient Greeks called spirits "daemons"

Socrates believed that a daemon was with him, and told him of wisdom from afar...

So did the Romans - they called the disembodied spirit of creation a "genius."

They didn't think of "geniuses" as individuals of exceptional ability.

I thought it was about those spirits that live in the walls of the studio -- like Dobby in Harry Potter -- and secretly assist in the creative process -- shaping the work.

Amazing! The "distance" I was talking about earlier exists.

people believed that

Ancient artists were protected, for example, from excessive self-importance.

Because it was known that no matter how great the work was, it was not his own credit, but the help of a spirit.

Even if I fail, it's not my fault

"Genius" was no good

This idea has long permeated the West,

The Renaissance changed everything A great idea appeared Let's put man at the center of the world Above all gods and mysteries... Mysterious creatures who spoke God's words disappeared...

It was the birth of Rational Humanism, and people began to believe that creativity came from within the individual.

For the first time in history, an artist is called a genius, not a genius by his side.

this is a big mistake

Isn't it a bit of a burden to the delicate human mind to make one person - male or female - believe that one person - is the essence and source of a sacred and creative mystery?

It's like saying drink the sun

It must be a distorted ego, which creates excessive expectations for the work-

The pressure of that expectation has killed artists for the last 500 years.

If this is true - and I believe it is - then the question is the future.

Is there any other way?

How to successfully deal with the mysteries of creativity - should we go back in time?

probably not possible

Erasing 500 years of rational humanistic thought... in an 18-minute speech.

There will probably be people in this room who doubt the scientific validity of the idea of ​​the fairies... how can they pour sweet honey on the work?

I won't go into it, but-

Here's what I want to raise, "Isn't it fine?"

"What's wrong?"

And more than any story I've ever heard, it explains the inexplicable vagaries of the creative process.

It's an irrational process that anyone who's ever tried to create knows -- that's what you all know -- an irrational process.

Sometimes it even feels like paranormal...

I recently met Ruth Stone, a poet extraordinaire, a poet who is still in her 90s.

Something like a mighty mass of wind—

Seeing it rushing across the land—

It seems that he sensed the vibration of the ground

There is only one thing to do, "run recklessly"

Running frantically home -- chasing poetry -- quickly picking up paper and pencil -- as the poem went through my body -- sometimes I didn't have time to catch it and write it down.

I ran and ran... it didn't make it in time - it slipped out of my body quickly. She said "probably right there - I went looking for the next poet." On another occasion -

This is excellent, but there were times when I felt like I could escape.

He ran frantically to find the paper -- the poem went through his body -- and just as he was about to get out, he grabbed the pencil -- reached out with the other hand -- and caught it.

I grabbed the tail of the poem, took it into my body from the tail end, and transcribed it.

The poem was perfect, but it was all upside down.

(Audience laughs) When I heard that, I thought, "No way."

(Audience laughs) It's not the part that passes through the body!

I'm a stubborn person, so my job -- I get up at the same time every morning -- and I painstakingly write it down, even though I'm --

There are moments when we meet

you have also experienced

Ideas come out of nowhere

What is this?

How do you handle it without getting upset? Keeping your sanity?

A modern example of coping is the musician Tom Waits, whom I met a few years ago for a magazine interview.

I told you this story. His life was typical of a struggling contemporary artist struggling to control his unwieldy creative urges, his inner urges...

As I got older and calmer -- I was driving down the L.A. freeway one day -- everything changed.

As I was flying, suddenly I heard a fragment of a song in my head As an elusive and frustrating epiphany... I can't get enough of it.

No paper, no pencil, no tape recorder

I was driven by the usual frustration "I miss this-" "I'll be haunted for the rest of my life"

"I can't, I can't"

I stopped instead of panicking

I stopped my train of thought - I took a novel action.

Look up at the sky - "Hey can't you see I'm driving?"

(Audience laughs) "Can you write a song now?"

"If you want me to write, come back." "When you can take care of me."

"If not, go elsewhere."

"Even Leonard Cohen"

Since then, the composition has changed

The style hasn't changed, but-

The composing attitude, and the anxiety that went with it, disappeared when "Genius" came out.

It's a strange, quirky collaboration, a dialogue between him and a strange external thing... a dialogue with another thing.

Hearing this story helped me change my approach to work a little bit.

When I was writing that bestseller -- when I was in despair -- I tried my best and it didn't work out -- I started thinking about the tragic ending, it's going to be the worst.

Worst ever, not bad!

When I began to think of burying-

I remember Tom's story - I tried.

I looked up from the manuscript and spoke to a corner of the room.

"Hey," I said aloud, "Even if this book isn't good enough—" "I'm not the only one to blame, right?"

"You know you're throwing with all your might, right?"

"If you want to be good, do your part"

"It's okay if you don't want to."

"I just do my part"

"Write it down." "I did what I did."

(Audience laughter) Because -- (audience applause) You see, right? Once upon a time in the deserts of North Africa, there was a dance and song festival on moonlit nights for hours until dawn.

It's amazing. Professional dancers are - amazing.

Sometimes, very rarely - dancers cross the line

You know what I'm talking about Have you ever encountered such a scene?

It's like time has stopped――The dancer passes through a certain boundary... Even though it should be the same as the usual dance―everything matches―

suddenly invisible to humans

Shine from within, under your feet - blaze divinely

At that time, people would guess what happened and call the name.

Put your hands together and start chanting "Allah Allah God God"

"That's God"

History books tell us that the Moors brought that practice with them when they invaded southern Spain, and over the years the pronunciation has changed, from "allah allah" to "ole ole"... you still hear it in bullfights and flamenco.

In Spain, the amazing movements of the performers - "Allah Ole", "Wow! Bravo!", a glimpse of God.

great this is it

But the trouble is the next morning, when the dancer wakes up -- it's 11:00 on Tuesday morning, and God is gone.

One old man with bad knees...maybe he'll climb that height again-

Even if I spin, no one will call the name of God... for the rest of my life?

it's hard

It's the hardest reality in creative life...

No, it might not be that bad... unless you believe that you had some extraordinary talent from the beginning...

If you think that power is borrowed - attached to your life from a mysterious source - and go elsewhere when you're done...

If you think like that, everything will change.

That's what I've started to think, and I've been thinking about it for the last few months, while I was writing my forthcoming book, the latest in a series of dangerously high expectations, the follow-up to an insane success.

I kept telling myself, when I was about to be swallowed- Don't be afraid

Don't flinch, just do what you do

Don't worry about the result and keep going

If dancing is your job, just dance

If a whimsical spirit is assigned to you and shows you even a momentary miracle in response to your efforts... "Ola!"

Even if you don't show me, I'll just dance

Even so, I still say "Olai" to myself

I believe so, why don't you spread the word?

But to keep "Olai" and true humanity and fortitude...

Thank you

(audience applause) Thank you.

(audience applause) "Olai!"

(audience applause)

[This talk contains provocative language. Watch at your own discretion.] Now, this is the only slide that all 6,400 of my students have seen in the last 15 years.

I think that in order to build a multi-billion dollar organization, we need to be clear about which human instincts and organs to target.

Humans are creatures that seek existence beyond human knowledge.

The competitive advantage of the human species as a species lies in the brain.

Our brains have the resilience to ask difficult questions, but unfortunately we don't have the processing power to answer them.

What is prayer?

It's about questioning the world and expecting some sort of divine intervention, without even having to understand how it works. An omnipotent, omnipotent, superhuman being who gives us the authority to say that this is the right answer.

"Is my child okay?"

You have interests, jobs, friendships, etc.

If you have a child, if something bad happens to your child, everything will fall apart, because in your world, your child is the sun.

"Is my child okay?"

Then type "tonsillitis symptoms and treatments" into the Google search box.

One in six searches on Google is one that no one has ever asked in the history of mankind.

No matter how much the priests, teachers, rabbis, scholars, mentors, and superiors are trusted, it's unlikely that one out of every six questions they ask has never been asked.

Google is the god of modern man

Given that your search is tied to your personal information, you'll find that you trust Google more than anyone else in your life.

(Laughter) Now let's move on to the torso.

(Laughter) And one of the other great human traits is that we don't just want to be loved, we also want to love.

Children who are undernourished but who get enough love thrive better than those who are well-fed but who don't get enough love.

But there are three signs that we could be joining the ranks of the centenarians, the fastest growing population in the world, those who live to be over 100 years old.

In descending order of importance, "heredity" is not as important as you think. Even if you want to continue your dissolute life and think, "Uncle Joe lived to be 95, the die was rolled."

it's not as important as you think

The second is "lifestyle".

About two-thirds of early cancers and cardiovascular disease can be prevented by not smoking, not being overweight, and being screened.

The number one sign or indicator of living to 100 is "how many people do you love?"

By taking care of people, things like surveillance cameras, low-resolution surveillance cameras in your brain, determine if you're adding value.

Facebook taps into our instinctive desire to love as well as to be loved, and promotes and strengthens relationships primarily through photos that generate empathy.

Let's continue our journey down the torso

Amazon is our consumer organ

We have an instinct to want more

Deficiency leads to hunger and malnutrition

If you open up your cupboards and closets, there should be 10 to 100 times more than you need.

Why?

Because the harm from scarcity is far greater than the harm from excess.

So "cheaper, more" is a business strategy that will never go out of fashion.

It's China's strategy, it's Walmart's strategy, it's the strategy of the most successful company in the world right now, it's Amazon.

You eat "cheaper and more", you digest it, you feed it into your muscle tissue and your skeletal system, you consume it.

Let's move on. When we feel that our basic survival instincts have been satisfied, we move on to our second most powerful instinct, which is to scatter the strongest, smartest, and fastest seeds around the world, to select and to pick the best seeds.

this can't be called a clock

I haven't wound a mainspring in five years.

This is my no-nonsense appeal: "If you have a baby with me, your child will be stronger than with someone who wears a Swatch watch."

(Laughter) The secret of business is exploiting the irrational organ.

"Irrational" is what Harvard and New York School of Management call high profit margins and shareholder returns.

Something like "high-calorie cream for children"

Is this bad?

A mother who knows the difference is loved

LOVE YOUR KIDS WHEN YOU CHOOSE OUR BUTTER

From World War II to the rise of Google, the most effective algorithm for acquiring shareholders was to use ordinary products to appeal to people's minds.

A better mother, a better person, a better patriot, if only I bought this soap instead of that soap.

Now, the number one algorithm that benefits shareholders isn't technology.

Looking at the Forbes 400

Except for the wealthy by inheritance and financial transactions

The number one source of wealth building is appealing to your reproductive organs.

The Lauder family and Europe's richest LVMH

2nd and 3rd place goes to H&amp;M and Inditex

Targeting the most irrational organs for shareholder benefit.

As a result, Apple, Amazon, Facebook, and Google have destroyed who we are.

God, Love, Consumption, Sex

How you share these things shapes who you are.Four companies, as for-profit companies, have reframed who we are.

At the end of the Great Recession, the market capitalization of these companies was equivalent to Niger's GDP.

It's now the equivalent of India's GDP, surpassing Russia and Canada in 2013 and 2014.

Only five countries have a GDP greater than the combined market capitalization of these four companies.

but something is happening

Just a year ago, conversations like, "Which CEO is the closest to Christ?"

"Who's going to run for president?"

A headwind begins to blow

everything they do bothers me

we suspect their tax evasion

Walmart has paid $64 billion in corporate taxes since the Great Recession, while Amazon paid $1.4 billion.

If the most successful companies in the world don't pay their fair share, how are they going to pay firefighters and soldiers and social workers?

it's simple

Companies that aren't as successful as they are paying more than their fair share.

“Alexa, is this okay?”

(Laughter) This is happening even though Amazon has added Walmart's market cap to its own market cap in the last 19 months.

Who's to blame? it's our fault

Because we don't choose overseers who have the guts to actually pursue these companies.

Facebook has lied to EU authorities, claiming that it is impossible to share data between our core platform and WhatsApp, which we are seeking to acquire.

Please approve the merger."

After the EU approves the merger – spoiler alert! knew everything

"I feel like I've been tricked

We're going to impose a $120 million fine," but that's still about 0.6% of the $19 billion purchase price.

If Mark Zuckerberg had insurance that the acquisition would go through for 0.6%, would he do it?

anti-competitive behavior

$2.5 billion in fines, $3 billion in cash flow, 3% of Google's balance sheet cash.

It's as if we're saying to these companies, "Lying and cheating is the smartest, most profitable way for shareholders."

We impose a fine of just 25 cents on a parking meter that costs $100 an hour.

lying is a smart way

Job destruction!

When Macy's needs two salespeople, Amazon needs one.

53,000 cashiers and store associates will lose their jobs if Amazon hits its projected $20 billion increase in revenue this year.

It's nothing out of the ordinary. This happens all too often in the business world, but no company has ever been this good at destroying jobs.

This is a Yankee Stadium's worth of workers.

The media industry is even more serious

About 150,000 creative directors, planners and copywriters will lose their jobs if Facebook and Google achieve their projected $22 billion increase in profits this year.

It's like saying to 2.5 Yankee Stadium's worth of people, "You're unemployed because of Amazon."

Now we get a lot of our news from social media, and a lot of the news that social media sends out is

It's "fake news"

(Laughter) I'm not allowed here to talk politics or use foul language or talk about religion, so of course I can't say, "Zuckerberg became Putin's bitch."

I can never say this

(Laughter) Their counterargument is, "Facebook is a technology company, not a media company."

If you create your own content, buy your own content from sports leagues, and advertise against it, you're really a media company.

Over the last couple of days, Sheryl Sandberg has lied repeatedly, saying, "We're not a media company."

Facebook seems to be allergic to its responsibility as a media company, while openly exploiting the profits of popularity and the influence of media companies.

Replace with McDonald's

Let's say 80 percent of the beef is fake, and it causes encephalitis and makes it impossible to make good decisions.

If you say "McDonald's is a bad company!"

They say, "Wait a minute, we're not a fast food restaurant, we're a fast food platform."

(Laughter) These companies and their CEOs, dressed in fluorescent blue and pink rainbows and blue blankets, are plagiarized to cover up what they're doing on a daily basis.

Why? Because we progressives are seen as mild but weak.

If Sheryl Sandberg had written a book about gun rights and anti-abortion, would she have let me go to Cannes?

no

I don't doubt their progressive values, but they're rooted in shareholder value, because progressives are perceived as weak.

They're gentle - remember Microsoft?

They didn't seem to be mild-mannered, and they never look into mild-mannered people.

I'm going to be on a plane tonight, and I'm going to be searched all over by a guy named Roy, a transportation marshal.

If someone suspects me of drunken driving on my way home, blood will be taken from my body.

But wait! Don't touch your iPhone, it's sacred

our new cross

It should be called "iPhone Cross" instead of "iPhone X"

apple is our religion

Steve Jobs is Christ, and I've decided that he's more sacred than a human being, more than a house, more than a computer.

Our blatant idolatry of innovation and youth has spiraled us completely out of control.

We no longer worship humanity and kindness, but people who create innovation and shareholder value.

Amazon gains power in the stock market and can even control the superpowers of a Jedi.

You can hit other industries with just a glance.

When Nike announced it would start selling on Amazon, its stock rose, and other shoe makers' stocks fell.

When Amazon stock goes up, the rest of the retail stocks go down, because what's bright for Amazon is dark for everyone else.

When Amazon bought Whole Foods, they cut the price of salmon by 33 percent.

Between the announcement of the Whole Foods deal and the closing of the deal, Kroger, America's largest pure-play food retailer, lost a third of its market capitalization as Amazon bought a food retailer that was one-eleventh the size of Kroger.

i was very lucky

A week before the acquisition, I was predicting Amazon's purchase of Whole Foods.

I said it openly in the media with a triumphant face

It was the biggest acquisition in Amazon's history. It was the biggest acquisition ever for a billion-plus. People asked me, "How did you know?"

Let me tell you a secret to this honorable audience.

How did you know?

I will tell you about it

I've been yelling at Alexa all day, trying to figure out how it works.

“Alexa buy fat milk”

"I couldn't find anything about high-fat milk, so I added it to my shopping list."

Then I said, "Alexa, buy organic food."

"Organic food search results are plum organic baby food banana and pumpkin flavor 12 pieces of 110 grams each

$15 total

do you want to buy? ”

And, as is often the case at this age, I got confused.

"Alexa buy Whole Foods"

"I bought outstanding shares of Whole Foods at $42 a share.

I have charged $13.7 billion to my American Express card."

(Laughter) I thought it would be more funny

(Laughter) We anthropomorphize these companies, and like when you're so upset about every little thing someone does in your life or relationships, you can't help but ask yourself, "Why am I so disappointed in technology?"

I think the ratio that technology used to be about 1 percent seeking shareholder returns and 99 percent improving human lives has been overturned, and we're completely focused on shareholder returns rather than being entirely human.

The Manhattan Project brought together 100,000 people to literally save the world.

technology saved the world

My mother was Jewish, and she was four and living in London when the war started.

If we hadn't won the nuclear race, would my mother have survived?

it would have been impossible

Twenty-five years later, perhaps the most impressive feat of humankind has been accomplished: the moon landing.

430,000 Canadians, British and Americans came together to successfully land on the moon with very basic technology.

Now, 700,000 of the brightest and brightest people from all over the world

Instead of rubber guns and water guns, we're literally playing with lasers.

They have the equivalent of India's GDP

After studying these companies for 10 years, I found out what their purpose was.

Is it about organizing the world's information?

Is it to connect people?

Is it to deepen friendships?

wrong

The reason they came together is an elite group of high IQs and creative minds with a sole purpose: to sell another crappy Nissan.

I'm Scott Galloway, I teach at the University of New York, thank you for your attention.

(Applause) (Chris Anderson) Unexpectedly, Scott has raised questions.

(Laughter) It was a spectacular speech.

(Scott Galloway) If you do it right

Is it like a talk show that you can invite to the sofa?

CA: No no, let's get to the heart of the matter now.

After years of worshiping Silicon Valley, we've all noticed that suddenly there's been a massive outburst of public dissatisfaction.

Some of you here may feel like you're adding to the blows and adding salt to the wound.

Do you feel no sympathy for them at all?

(Galloway) Not at all

The problem is this: it's our fault, not theirs.

they are for profit

don't care about our mental health

It's not like they'll take care of you when you're old.

They're just doing what they're supposed to do because we've built a society that puts shareholder interests above all else.

But we have to elect officials and force them to be subject to the same scrutiny as any other corporation, and that's it.

CA: There's another narrative that probably fits the facts as well. The reality is that many corporate leaders have good intentions -- not necessarily all, but many employees do.

We know people who work for these companies, and we agree with their well-meaning intentions. So another narrative is that it has unintended consequences. The technologies that we've unleashed have unpredictable effects, like filter bubbles, on algorithms that personalize the Internet, and make us vulnerable to weird things, like Russian hackers creating accounts and doing unintended things.

Could it have unintended consequences?

CA: Well, statistically speaking, I'm pretty sure it's comparable to any other organization with over 100,000 employees.

I don't think they are bad people

In fact, I'll tell you that there are many respectable corporate leaders who are public-minded.

The problem is that it has a monopoly of up to 90% of the market and search, and is now larger than the entire advertising industry in a country, but by increasing its market share, it can't help but use that power at will to increase the financial security of itself and the families of its employees.

That's the standard for regulation, and it's the basic providence for the corruption of power that's happened throughout history.

They're not bad people, we let them spiral out of control.

CA: I mean, maybe there was a little exaggeration, right?

To some degree, I don't think Larry Page or Jeff Bezos would wake up in the morning and actually think, "I have to sell Nissan cars."

i don't think so

They're trying to build something cool, and when they reflect, they'll probably shudder as much as we do about some of the things that happened.

I wonder if there's another way of looking at it, that when your business is based on an advertising model, there's a danger that you're more willing to take responsibility for.

(Galloway) Above all, I think it's difficult to operate in pursuit of shareholder returns.

it's not for profit

People work for these companies because they want financial security for themselves and their families, and that's the main premise.

And when they get to the point where they can control an economy this big, they use any weapon at will.

I don't think they're bad guys, but I think the role of government and our role as consumers is that the role of the officials we elect is to ensure oversight.

We gave them too much of an indulgence because these companies are so attractive.

(Anderson) Scott It was an eloquent and spectacular talk.

Mark Zuckerberg, Jeff Bezos, Larry Page, Tim Cook.

thank you scott

(Galloway) Thank you very much.

(applause)

Hello

Rumor has it that you'll be invited to give a TEDx talk twice in your career, once when you're on your way up the ladder, and once when you're starting to falter.

(Laughter) So, "I'm glad you're back."

(Laughter) "Laughter." That's the theme for today.

I don't know if laughter can be mass-produced, but I'd like to take a moment to look at it and think about what laughter is in the first place, and what role laughter plays in our lives and in society.

I will tell you four jokes today

That's all

I'll tell you four jokes, and if there's a lesson to be learned from them, I'll consider them.

Before I tell you my first joke, I'm going to do a little experiment because the venue is Munich.

There have been terrible things said about Germans' sense of humor, especially the rumor that there is no such thing.

(Laughter) I'm going to do an experiment to see if this terrible assumption is true.

So for the first joke, only Germans should respond.

(Laughter) You're welcome to laugh or not laugh.

Please, don't try to distort the results of the experiment by forcing yourself to laugh.

(Laughter) This is a scientific experiment.

here's the first joke

A man is dying in his bed at home (Laughter), and the kitchen smells great.

It smells like my favorite chocolate chip cookie

With the last of his strength, the man climbs out of bed and goes into the kitchen where his wife of 50 years is baking delicious-looking chocolate chip cookies.

There are four plates of cookies just out of the oven.

With the last strength he had left in the world, he reached out for one of the cookies, and his wife saw it and flew over and clapped his hand and said, "No! It's for a funeral."

(Laughter) Here's the news: TEDx talk finally reveals German sense of humor

(Laughter) Now let me tell you something, "If you can't laugh, you can't think."

If you lose the power to laugh, you will also lose the power to think.

In other words, "The smartest people in the world are also the funniest people in the world."

The smarter you are, the more interesting you are.

Why

My answer is this: It's not right to take life's stupidity seriously.

Humans are among the beings that are brought to life by comedy. Humans are intelligent enough to ask the so-called great fundamental questions, "Why do we exist?" "Who are we?"

Two elderly couples are walking down the street

Two old women walk in front of two old men, and one of them asks, "What did you do last night?"

The second person answers, "Let's go to a restaurant.

it was great

The food was really good and the price was very reasonable

It was a real bliss.”

The first person said, "That's good.

What kind of restaurant is that? ”

The second person yelled, "Hmmm."

"What was the name of the flower that smelled so good?

It's red and has thorns on its stem."

The first person answers, "It must be a rose."

The second said, "Oh, that's right."

"Rose! What was the name of the restaurant you went to yesterday?"

(Laughter) (Applause) This joke is as infinitely precious to me as a Monet painting or a Shakespeare sonnet.

For a long time, laughter has always been very important to me.

Seriousness is — and I hope you agree — seriousness is dangerous.

The dangers of seriousness aren't just for yourself, they're for society as well.

Why

Part of the reason, I think, is that seriousness -- the power of seriousness, the power of the absence of humor -- binds us to bigotry, ideology, ruthlessness, narrow-mindedness, because humor requires an open mind.

Empathy and forgiveness are essential

Humor Forgives Anything

The relationship between humor and seriousness has long been clear.

Winston Churchill, known as a witty man, said, "People who cannot understand pleasant things cannot understand the serious things in the world." "People who cannot understand the pleasant things cannot understand the serious things in the world."

In the words of American civil rights activist Clarence Darrow, "When you lose the power to laugh, you lose the power to think."

When you lose the power to laugh, you lose the power to think.

Engaged in very high politics, these two men knew very well that sometimes only humor can break straitjackets and ideological entanglements.

I'm going to tell you about one flight, it was a Lufthansa flight from Munich to New York.

It was a very smooth flight

Shortly after, in New York, there was a tremendous explosion on the right wing of the aircraft. A tremendous explosion occurred on the right wing of the aircraft.

We have four engines, so please calm down.

We had a problem with the first engine... (explosive sound) But the rest of the engines... (explosive sound) We only have one engine left, but the pilot was able to continue flying with only one engine...

(Explosive sound) Dear passengers, we will land on the water from now on.

(Laughs) I'll let you know when it hits the water, so please calm down."

The pilot, of course, it made a spectacular landing.

The captain's announcement came in again, "Everyone, thank you for following our instructions.

Please listen carefully to the instructions from now on.

All passengers who can swim should line up on the right wing of the aircraft.

All passengers who cannot swim, please line up on the left wing of the aircraft.

The passengers did as they were told by the captain. Finally, the captain rowed the inflatable raft to the front of the fuselage.

Please listen carefully to the instructions from now on.

Customers on the right wing, New York is here.

(Laughter) Only three nautical miles away, the water is warm and the currents are on our side.

good luck

Now, the left-wing customer, 'Thank you for using Lufthansa.'" (Laughter) (Applause) Why did you laugh? Why are you laughing?

What made you laugh in the first place?

This question has puzzled philosophers for thousands of years.

For thousands of years, the greatest philosophers, Plato, Freud, Wittgenstein, Nietzsche.

Here is the answer given by the philosophers

Human laughter is an ancient reaction to animal encounters when danger has passed.

The best answer that philosophers have come up with is that laughter is an ancient response to animal encounters when the danger has passed.

(Laughter) Just as proofs in mathematics must be purely mathematical, so the definition of laughter must not be laughable.

so i'll start over

Today, let's try to define comedy better than Plato or Nietzsche or Freud.

What is the oldest joke in human history?

a thousand years ago

It's a joke that was a big hit at the end of the 10th century. (Laughter) It goes like this.

There was a funeral at the church

Imagine a medieval church, and everyone is in tears except for one man.

The priest noticed that there was only one man who wasn't crying, and at the end of the funeral he approached him and asked, "Do you know the man who died?"

The man answers "yes i know"

Father: Well then why aren't you crying?

Man: “I want to cry, but I don’t belong to this parish.”

I want you to understand that this was a big hit a thousand years ago.

(Laughter) And that makes for an interesting observation about comedy: to understand a joke, you have to belong to that "parish."

I'll explain what I mean

The "parish" you have to belong to to understand a joke is a society of shared understanding. If you feel like you belong to a society that shares a shared understanding of understanding the same joke, then you can laugh at any joke that supports your sense of belonging to that group.

Jokes bring people together and are warm and welcoming.

And in gratitude for their acceptance, we open our mouths, suck air into our chests, use our bodies to do absolutely incredible things, and make sounds that no other creature has a history of, and will never have, except humans, a sound that will never be the same, laughter.

How wonderful and special it is to be able to make other people laugh

People who make other people laugh aren't just funny.

this is no big deal

A person who makes people laugh creates hope, welcomes strangers warmly, dispels despair, and is both a doctor and a messenger of peace.

read a few words

I made a note of a certain word

It goes something like this: "Comedy is a clash between two sides, one perspective versus another, one sensitivity versus another, high versus low, east versus west, bright versus dark, old versus young, it happens when two worldviews collide, two civilizations collide, and when you hit two flints, it's like a life-giving spark that can ignite a fire."

I thought it was an excellent quote. I wrote it myself this morning.

(Laughter) Let me give you an example of how humor can break out of entrenched thinking and straitjacket.

In 1995, when the Second Intifada broke out in Palestine, I was in London to see Jackie Mason, a major Jewish comedian.

Despite the rich content, there were also quite a few controversial remarks.

As usual, it was a very interesting show, but halfway through, I said I wanted to talk about something serious. The audience roared.

"I want to talk about the Palestinian issue," he said, and I could feel the terrifying tension in the audience.

And Jackie said

"Israeli Prime Minister Netanyahu must want peace.

must be so

In fact, Netanyahu would be happy to give the West Bank back to the Palestinians right now, but there's a reason he can't because the land is already in his wife's name."

(Laughter) The crowd, mostly Jewish, burst into laughter and laughed for five minutes.

It was heartbreaking

During those five minutes, I couldn't help but feel that if we were somehow moving forward towards peace, if we were even a little closer to a compromise between the two countries, this would make us laugh.

If we can laugh together, we can coexist

What do you think is the secret of life?

Some people call it "knowledge," but it seems to me that humans haven't learned much in the process of evolution.

There's so much to learn from history, but humans seem to be the worst learners.

If you ask me, the secret of life is laughter.

Laughter is the husband of truth, the nemesis of dogmatic doctrine, it turns the worthlessness of existence into gold.

I was recently asked, "How do you want to die? Can you imagine?"

After thinking about it for a moment, I answered, "I want to die like my father died. I want to die quietly in my sleep. I don't want to die screaming like my father's passenger."

(Laughter) The last word in every joke is called a "punchline" in English, and "die poente" in German.

This one word is the part where the miracle happens, the part where you're surprised at something that's been revealed, and the rapture that radiates from this surprise.

Now I say goodbye to all of you, and may your own life be a joke.

(Laughter) Yeah, I hope there's a punch line or "die Poente" in the jokes that make all of your lives a joke. "That cookie is for your funeral!"

Don't forget your mischievousness and keep on laughing peace

(applause)

It takes a certain kind of intelligence to do themes and variations, because you always have to compare the variations to the themes you have in mind.

You might say that the theme is the essence, and everything that follows it is a variation of the theme.

Six years ago, I think, I was commissioned to create a series of paintings that would celebrate the birth of Piero della Francesca.

At first, I thought it would be inconceivable to paint a painting based on a clown, but then I realized that I could think of the clown as the essence, the same way that when you look at Piero della Francesca, you look at the tree outside the window.

I'm so liberated

It may not be very insightful, but I was able to start a path of themes and variations based on a certain Piero work, which was a wonderful painting in the Uffizi Gallery, Portrait of the Duke of Montefeltro, facing his wife, Battista.

Once I realized that I was free to play with the subject matter, I made the following series of drawings.

This is an original by Piero della Francesca, one of the greatest portraits in human history.

without comment let me show you a few

It's a variation of the head of the Duke of Montefeltro, who is said to be one of the great Renaissance figures and the inspiration for Machiavelli's The Prince.

He lost one eye in battle, so he's always in profile.

this is batista

I decided to move them around a little bit, facing in the same direction for the first time in history.

husband! It's a misunderstanding

A visitor from another of Pierrot's works, from "The Resurrection of Christ" -- it looks like they're trying to talk.

This is a large panel with 4 panels Top left Top right Bottom left Bottom right

By the way, I don't understand the conflict between abstraction and naturalism.

I don't think there's much room for argument because painting is inherently abstract.

(Laughter) So one day my wife and I were driving through the country, and I saw a sign ("Trusted Dutchman Auto Repair") and I said, "This is a great design."

And my wife said, "What are you talking about?"

"No, it's very persuasive. The purpose of the sign is to lure customers into the repair shop. Many people are suspicious of the repair shop and they use the word 'trust' because they think they'll get ripped off. But everyone says they can trust themselves."

But what is a trustworthy Dutchman (Dutchman) -- (laughs) Great! "

Because when you hear the word Dutchman -- it's an old word, we don't call Dutch people Dutchman anymore -- but when you hear Dutchman, you think of a boy sticking his finger into a crack in a dike to prevent it from bursting and flooding Holland.

In other words, the word Dutchman takes away the venom.

If you think it's exaggerated, you should try replacing it with an Indonesian.

(Laughter) You could be French.

(Laughter) I think the Swiss would be nice, but they'd be more expensive.

(Laughter) I'm just going to give you a quick rundown of the actual poster making process.

I do a lot of work for the School of the Visual Arts (SVA), where I teach, and the headmaster of the school is a great guy named Cyrus Rose, who often gives me fragments of words and says, "Make something with this."

It was the same at that time

The words were: "Words are governed by the same rules as fashion Too new or too old can be quirky Don't be the first to try the new Don't be the last to throw the old away"

I didn't know what to do

I really struggled with this

So the first thing I did was I didn't have any other ideas, so I wrote these words down, and I made some things bigger and somehow designed them to look like they were in the background.

Then I broke it down and moved it around, copying some words onto colored paper and pasting them onto the dirty board.

I thought I might get something out of it, because it was Alexander Pope's words, "Words are strange, new and old, rule the first and last Pope," but I just messed up.

nothing happened

Sometimes when I face a difficult problem, I write down what I know.

But here we see the birth of the idea, the word 'NEW' comes from 'OLD'.

this was the beginning

This shows the relationship between 'OLD' and 'NEW' 'NEW' is coming out of 'OLD' in the background

And then we've made some variations, but it's still not quite graphically cohesive.

I also made a little interesting version like this, where you can build things up in your head from the clues.

W is clearly W, and N is clearly N, but there's only a fragment and there's not much information.

Next, I tried using the new typeface and the old typeface.

(Laughter) At this point, I was really cornered.

And I think I've done something really embarrassing, but I brought in two paintings that I did for other purposes, and put them together.

It says 'dream' on the top

And I thought, "Okay, let's change this word.

Let's join SVA and make our dreams come true, or something that speaks of dreams."

To my credit, I was so embarrassed to do this that I didn't submit this sketch.

And finally I came up with the following solution

Now, it doesn't look all that interesting, but it definitely stands out from other posters.

For one thing, it goes beyond the notion that posters are self-explanatory and don't need explanations.

In the world of graphic arts, we often say, "If you have to explain it, it's useless."

One day I woke up and thought, ``If it wasn't so.''

(Laughter) My description on the bottom left says,

"Thought: Impossible in this poem

Cyrus' quote sense is always good

No image will come to mind from now on."

Now I'm exposing myself to you

Something I would never want to do as a professional

"Maybe you can create an image with just this word

What is the heart of this poem?

If you want to be serious, don't follow the trend

Isn't making posters like this trendy?

Let's simplify the idea even more How about 'NEW' coming through 'OLD' from behind like this"

Here's a little picture -- remember the one I got rid of?

I was thinking of using that

So this is a bit of an alternative, and it says, "Not bad" -- critiqued by myself, "but more descriptive than visual.

What I want to say is that 'OLD' and 'NEW' embrace each other dialectically and are inseparable, defining each other and dancing."

And then you ask yourself -- "Am I too naive?

Is it too simple and straightforward, or does it look meaningful?

this is a big difference

may be ashamed

In fact, fear of embarrassment drives me as much as passion.

Can this attract students to school? "

(Laughter) There are two new things here -- two.

One is -- don't be willing to expose yourself to a critical audience and say you're confident in what you're doing.

As you know we have to show the front

So -- you have to be confident. If you don't believe in your work, who else will?

Here's one that presents a questioning perspective on graphics.

I think this is a great contribution.

And the other thing is that you're giving us two solutions at once.

(Laughter) This is also a relatively new idea.

This is a series of experimental works.Do posters have to be square? I am asking the question

this is a little trompe l'oeil

This poster is not folded

It's not broken, it's cut diagonally in the photo

There is a similar small work in the upper left corner

And this is a very strange poster, because it uses computerized perspective, and it's not sitting still in this space.

Sometimes the back looks wider than the front, but that changes.

If you stare at it, it will emerge from the screen toward the audience.

but i don't have time

(Laughter) This is an experimental piece -- it's related to the properties of perspective. The shape of the frame follows the properties of perspective, and the shape of the bottle is the same as the shape of the frame, but it appears to be in the foreground.

This is a piece for the Art Directors Club, with Anna Reese casting a long shadow.

One of the school of visual arts posters

I didn't want to embarrass myself in one of the hotly contested competitions with 10 artists, so I worked hard.

And the idea was so cool that you could put 10 posters up on the subways all over the city, and every time you got on the subway, you'd come across a different poster, each with a different idea of ​​what art was.

But I got stuck in the idea of ​​"what is art?" and tried to determine what art is.

But I gave up and said, "Art can be anything."

The moment I said that, I realized that there was a 'hat' hidden in the word 'whatever', and I arrived at the inevitable result.

But this also became one of my explanatory posters.

I'm going to add a verbal explanation to this poster, because you have to understand it.

(Laughter) Here's "Notes for the Viewer -- To express the idea that art is mystery, continuity and history, I decided to use Magritte's man in the bowler hat as a modern visual quintessence.

In the age of computer manipulation, I am convinced that surrealism will become a banal shadow of my past self.

The phrase 'art is anything' expresses the current inclusiveness surrounding creation, like the idea that 'it's not what you do, it's how you do it'.

Magritte's shadow falls in the center of the poster, and the man in the shadow cuts out the word 'hat' hidden in the word 'whatever', creating a poetic situation.The four hats on the poster show how art should be defined: the thing itself, the value of the thing, the shadow of the thing, the form of the thing.

whatever"

(Applause) Now

(Applause) I didn't submit it, but I do like it, and I'm going to use the same words --

A few years ago there was a wonderful experiment by Bruno Munari with letterforms -- to see how well they could be legible.

This idea has been stuck in my head for a while

And then I took the piece off and put it on the bottom

Of course, these are "wreckages," and that's what it says.

But it actually reads -- "Art is wreckage."

thank you

(applause)

Pablo Neruda published his first book of poetry when he was 19.

He later won the Nobel Prize for Literature, saved 2,000 refugees, spent three years in political exile, and was a candidate for president of Chile.

Romantic and revolutionary, Neruda was one of the most prominent poets of the 20th century, but also a familiar and controversial figure.

Originally written in Spanish, many of his poems are based on plain language and everyday experiences, creating a lasting impact.

Neruda's real name was Ricardo Eliecer Neftali Reyes Basoalto, and he was born in 1904 in a small town in Chile.

His father didn't want him to become a poet, so he began writing at the age of 16 under the pseudonym "Pablo Neruda." The poems in his early poetry collection, "N0 Poems of Love and a Song of Despair," are tender and sensitive, illuminating the subtleties of love and joy.

For example, in "Poetry Book No. 6," he wrote, "Your memories are light, smoke, and still ponds. Behind your eyes, the setting sun shines."

Many of the 225 short poems in the collection of poems, All the Odes, are dedicated to all sorts of little things, from shoelaces to watermelons and other small things around us.

The onion is "more beautiful than a bird with dazzling feathers." And the tuna in the market is "a torpedo that emerged from the deep sea.

Despite this early literary success, Neruda was struggling financially, taking on diplomatic jobs in places like Burma, Indonesia, Singapore and Spain.

In 1936, while Neruda was working at the consulate in Madrid, civil war broke out and the government was overthrown by a communist military junta.

Neruda organized refugee assistance from Spain to Chile, saving 2,000 lives.

Twenty years later, Neruda recorded his foreign experiences in a three-volume collection of poems, "Residence on Earth."

Many of these poems were experimental and surreal, blending an epic perspective with a longing to discuss supernatural subjects and political conflicts, and a poetic responsibility to speak out against injustice.

In "I Explain a Few Things," the devastation of the Spanish Civil War remains in his mind in every detail.

For the rest of his life, Neruda remained devoted to revolutionary ideas.

Because of his political ideology, he spent several years in exile, only returning to Chile in 1952.

While in exile, he published the seminal Great Song.

This book attempts to retell the entire history of Latin America through poetry, touching on everything from flora and fauna to politics and warfare, and above all, it pays tribute to the common people who have advanced civilization.

After returning from exile, he continued to travel, but spent the rest of his life in Chile.

In 1970, at the age of 66, Neruda became Chile's presidential candidate, but gave in to Salvador Allende and became his close advisor.

But in 1973, Allende was overthrown by General Augusto Pinochet's coup.

Neruda died in hospital a few weeks after the coup.

Rumors swirled that his death came shortly after a coup d'état and that he had been murdered, but hospitals recorded the cause of death as cancer.

Today, Neruda's words are chanted at protests and marches around the world.

Like his life, Neruda's poetry bridged romance and revolution by highlighting everyday moments worth fighting for.

In the mid-16th century, the talented young anatomist Andreas Vesalius made a shocking discovery: the world's most famous book of anatomy was wrong.

In addition to leaving out many details about the human body, it included organs from apes and other mammals.

Vesalius believed he was right, but to make these mistakes public was to confront the most famous physician in the history of medicine, Galen.

But what was this great man like?

And why did physicians more than 1,300 years later revere and fear Galen?

Galen, born in 129 AD, left his homeland at a young age to refine his medical knowledge in the Mediterranean region.

He returned home as a gifted surgeon, not only with a passion for anatomy, but also a penchant for directing.

He gleefully entered a public autopsy contest, exposing his fellow physician's embarrassment.

In one demonstration, one of the pig's nerves was tied off, making it silent.

In another demonstration, he took out a monkey's guts and challenged his colleagues to put it back together.

My colleagues couldn't do it, so I fixed it myself.

These brutal feats earned Galen the position of gladiatorial surgeon in Rome.

Eventually he left the arena and became a medical doctor for four Roman emperors.

While his peers debated symptoms and their causes, Galen was preoccupied with studying anatomy.

He was convinced that each organ had a specific function.

Since the Roman Empire strictly prohibited the use of human cadavers, Galen performed many dissections on animals.

Despite these limitations, his exhaustive research yielded surprisingly accurate conclusions.

Galen's most important contribution was the observation that the brain, not the heart, controls the body.

He proved this theory by opening the skull of a live cow.

By applying pressure to different parts of the brain, we were able to associate different areas with specific functions.

In other experiments, he was able to distinguish between sensory and motor nerves, established that urine was produced in the kidneys, and reasoned that respiration was controlled by nerves and muscles.

But these wild experiments also gave rise to some peculiar misunderstandings.

Galen didn't realize that blood was constantly circulating through his body.

Instead, he believed that the liver would continue to make blood without limit, flowing in one direction to the organs and being completely exhausted.

Galen also made a name for himself by solidifying the famous theory of the four humors.

Introduced hundreds of years ago by Hippocrates, this misguided hypothesis reduced most medical problems to imbalances in the four fluids that flow through the body, the body fluids.

To correct these fluid balances, doctors resorted to dangerous procedures such as exsanguination and the use of laxatives.

Despite being fatal, Galemos' scant knowledge of the circulatory system made him a strong proponent of these treatments.

Unfortunately, Galemos' self-esteem led him to believe that everything he discovered was more important than anything else.

He wrote papers on everything from anatomy and nutrition to doctors' treatment of inpatients and painstakingly compiled them for posterity.

For the next 1,300 years, the medical view of Galen's many treatises dominated all educational institutions.

His paper became the standard for guiding the next generation of physicians, who in turn wrote a treatise extolling Galen's ideas.

Even the doctors who actually dissected human cadavers, despite seeing evidence to the contrary, inexplicably repeated the same mistake as Galen.

On the other hand, the few doctors who dared to advocate dissenting views were either ignored or denigrated.

For 1,300 years, Galen's legacy was irrevocable, until the Renaissance anatomist Vesalius openly disagreed.

His authority as a distinguished scientist and professor influenced many young doctors of his day.

Still, it took another 100 years to accurately describe how blood flow works, and another 200 years for the theory of the four temperaments to fade away.

In some ways, we today can benefit from Galen's experiments without placing the same amount of faith in his more uncertain ideas.

But perhaps just as importantly, science is in an ever-evolving process, and we should always put evidence above pride.

This is Odontochelys semitestacare

It's a tiny creature that spends its time playing in the water in the swamps of the late Triassic, along with many other reptiles.

Beneath the surface, we have our best defensive system against attack: the hard shell on our stomachs.

Odontochelys is an early ancestor of turtles.

Its half-shelled body illustrates an important point about modern turtles: Turtles develop two completely separate shells at the embryonic stage.

Both carapaces are extensions of the animal's skeleton and are made up of more than 60 bones together.

Turtle embryos, like other animal embryos, consist of undifferentiated cells that later differentiate into specific types of cells that transform into organs and tissues through gene expression and cell-to-cell communication.

Initially, turtle embryos look very similar to other reptile, bird and mammal embryos, but the bulge of cells called the crest is unique to turtle embryos.

This ridge extends from the neck to the waist, forming a disc-like shape.

The carapace helps form the carapace, the dorsal side of the turtle's shell, probably by attracting the cells that become the ribs.

Instead of extending downward to form the normal ribcage, the ribs extend outward toward the sternum.

And the ribs secrete signaling proteins that turn the surrounding cells into bone-forming cells.

These 50 bones continue to elongate until they meet at suture lines.

A ring of bones strengthens the edge of the carapace.

The outer layer of cells that make up the skin form scales, the scales that cover the back.

What promotes the formation of the plastron, which is the ventral side of the carapace, are neural crest cells, which form various types of cells, including neurons, cartilage, and bone.

These cells form a thick, shield-like structure that spreads across the abdomen and gathers in areas that form nine plate-like bones.

It eventually joins the carapace along the suture line.

Turtle shells have obvious advantages in protecting them from predators, but their solid protective layer also poses some problems.

As the turtle grows, the sutures on the carapace and plastron widen.

Most mammals and reptiles use an elastic ribcage to breathe by stretching the ribcage, but turtles breathe using two abdominal muscles on their shells, one for inhalation and one for exhalation.

So how did the shell evolve?

Although there are still gaps in the fossil record, it is believed that the first step in evolution was the thickening of the ribs.

The oldest known turtle ancestor is a creature called Yunotosaurus africanus, which lived 260 million years ago and looked nothing like modern turtles, but it had broad, flat ribs that connected powerful forearm muscles.

Yunotosaurus is thought to have lived in what is now southern Africa, where it dug burrows to make its home.

Odontochelys semitestasia reveals a later stage in turtle evolution, with thick ribs like those of Yunotosaurus and defensive plates on the abdomen.

The earliest fossil tortoise that has all the characteristics of a modern turtle shell is about 210 million years old, a species called Proganochelys quenchsteadi, with fused ribs.

Proganochelys could operate on both land and water.

Unlike modern turtles, it couldn't retract its head into its shell, but it did have defensive spines on its neck.

Modern turtle shells are as diverse as the types of turtles.

Sea turtles have flat, light shells that allow them to move efficiently through the water.

Tortoises, on the other hand, have a raised shell that allows the predator's jaws to slide off, making it easier to get up when knocked over.

The shells of leatherback turtles and soft-shelled turtles lack the bony ring that surrounds the edge of the carapace and the hard scales that cover the shell, allowing them to fit in cramped spaces.

I've been a cop in a big city for nearly 25 years.

It's long, isn't it?

During those 25 years, I went through all ranks, from constable to chief of staff.

A few years ago, I discovered a surprising fact.

Starting in 2014, when I started studying aspiring police officers training at the Police Academy in New Jersey, I found that 65 to 80 percent of the women were failing because of their physical test results.

The way the test was administered was changed, and 10 short "physical training sessions" were set, during which passing the physical ability test became a requirement for completion of the academy.

This practice put women at a huge disadvantage.

The entire course is five months long, but they were required to pass the physical fitness test within about three weeks.

it's ridiculous

Both law enforcement and academy students invested heavily in training at the academy.

Before enrolling, students must undergo a thorough background check, undergo physical and psychological examinations, and quit their jobs.

And you spend over $2,000 on tuition and equipment, and many drop out in the first three weeks?

After seeing the dire situation in New Jersey, I decided to look at the situation of female police officers across the United States.

Fewer than 13% of police officers were women.

Over the last 20 years, that number has remained flat.

The most recent data show that in 2013, only 3 percent of general managers were women.

This percentage should be increased

Countries like Canada, Australia, and the United Kingdom have double the number of female police officers.

And New Zealand is well on its way to achieving the goal of equal numbers of male and female recruits by 2021.

The reason other countries are so aggressive in their efforts to increase the number of female police officers is because of the overwhelming amount of research that has been done over the last 50 years that supports the fact that women make the police.

Research shows that female police officers use less weapons and are less likely to be accused of excessive force.

Fewer cases where female police officers are accused or complaints from citizens

The very existence of female police officers acts as a deterrent to the use of weapons by the officers around them.

Although they are involved in violent incidents as often as or more than male police officers, female police officers are better able to defuse violent and intimidating behavior.

Being a woman is one of the great strengths of being a police officer, but we're not getting hired because of unfounded physical fitness standards.

The problem is that there are roughly 18,000 law enforcement agencies in the United States, and each agency has its own set of physical performance standards.

Many police academies rely on the "ideal male cop" criteria, resulting in fewer female cops.

Such academies overemphasize physical ability and underestimate qualities such as community policing, problem-solving and communication skills.

Under such circumstances, the training conducted will not match the actual situation of police activities.

There are very few aspects of police work that require physical ability.

Most of my day's work is mediating disputes between residents.

that's the reality of police

are my children

If we change the tests that give us discriminatory results, we can close the gender gap in the police force.

A federal court has ruled that there are physiological differences between men and women when it comes to physical performance.

It's a scientific opinion

The FBI, the Federal Marshals Service, the Drug Enforcement Administration, and the United States Armed Forces, organizations that the police hold in great esteem, rigorously review the content of physical fitness tests to ensure that test results are gender-neutral.

I wonder why?

because it costs money to hire

I want to recruit and retain the best candidates.

The aforementioned studies have revealed yet another

Well-trained women, in addition to their overall physical ability, are also as capable as their male counterparts in the more important aspect of performing their duties.

I have to admit that the police are having a tough time recruiting people right now.

But if you really want more applicants, you can improve.

The police can recruit more women and take advantage of the women's traits that research reveals by making the physical fitness tests physiologically based in the spirit of Title VII, making them relevant and job-related, and then training qualified candidates to crack them.

We can increase the number of female police officers, we can close the gender gap, we can do it by changing the exams that have discriminatory results.

also a solution

We have research, science and law

Changing the way we test physical fitness should be a really simple solution.

thank you

(applause)

In the winter of 2012, when I visited my grandmother's house, in southern India, the mosquitoes there seemed to love American blood --

(laughs) Really

During my stay, I received an unexpected gift.

This is an antique instrument, hand-carved out of precious wood more than a century ago, and it's studded with pearls and strung with dozens of metal strings.

It's a family heirloom that connects my past and my future, the country where my parents were born and the place I'm going to choose.

I didn't realize it when I got it, but it later became an important metaphor for my research.

There's a saying, "There's never been a better time."

But isn't the present rather "the present only exists"?

We seem to be in control of our lives, our economies and our politics in the blink of an eye.

It's easy to fill your head with the trivial things you did that day, and the tweets that celebrities sent out at that time.

It's the same with business, where in the pursuit of immediate profit it's easy to neglect what's necessary for future growth.

So do governments, which quickly become bystanders, allowing fisheries and farmlands to deplete rather than protect them for future generations.

I feel that if this continues, our generation will not be able to be good ancestors.

Humans have evolved to be able to foresee, map the stars, dream of the afterlife, and plant seeds for later harvest.

This extraordinary power, also known in the scientific community as "mental time travel," underpins nearly everything in human civilization, from agriculture to the Magna Carta Internet, all of which began in the mind.

But let's face it, what we're doing right now, it seems like we're not using this amazing ability much. Why on earth?

There's a problem with the way communities and business institutions work.

It's a mechanism that prevents us from looking too far ahead.

Now let me tell you about three big mistakes we're making.

The first is the wrong evaluation target.

When you look at a company and you look at their quarterly earnings or their short-term stock price, it's probably hard to tell whether they're going to grow their market share or create new value over the long term.

When it comes to children, it's not always good for the child's long-term learning and curiosity that parents focus on test scores.

We don't appreciate what will be important in the future.

The second mistake that prevents us from looking ahead is in what we reward.

We celebrate political and business leaders when they deal with disasters and make them public, but that doesn't mean we encourage them to put money into preventing disasters in the first place, to protect communities from floods, to fight inequality, to fund research and education, to invest in the future.

The third mistake that prevents us from looking ahead is our lack of imagination.

When we think about the future, we tend to focus on specific predictions, whether we use astrology or algorithms.

Compared to that, it's much less likely that you imagine the various possibilities of the future.

When the Ebola epidemic broke out in West Africa in 2014, public health professionals around the world saw the early red flags, and predictive tools showed how the epidemic could spread, but they didn't see it as an epidemic.

With so much information and accurate forecasts, people often don't prepare for the biggest hurricanes because they can't imagine how dangerous they can be.

Now, when you hear stories of these mistakes, it may seem bleak, but none of them are inevitable.

you can avoid all

To make better decisions for the future, we need tools to help us look ahead, to help us think ahead.

It's like the telescopes that old sea captains used to see the horizon.

Instead of looking beyond distant oceans, it's a tool for looking far into the future in time.

Here are some that I found in my research that I hope will help you read further.

The first tool that I'm going to show you is a long-term commitment that is still profitable today.

This is Wes Jackson, a farmer we met in Kansas.

Jackson knew that most of the crops in the world today are grown in a way that eats up the fertile topsoil that the next generation needs to feed on.

Jackson decided to join forces with scientists to grow perennial grains that take deep roots and protect the farm's fertile topsoil, preventing erosion and protecting future crops.

But now, to get farmers to grow these crops, they had to find companies that would increase their annual yields and make cereals and beer out of those grains, so that they could work for tomorrow while still making today's profits.

This strategy is proven

It's a strategy used by George Washington Carver in the post-Civil War American South in the early 20th century.

Carver famously devised 300 uses for peanuts, and the products and recipes he came up with made peanuts so popular.

But it's not very well known why

He was trying to help poor tenant farmers in Alabama who were struggling with a declining cotton harvest. Planting peanuts in their cotton fields would improve the soil, which in a few years would improve cotton yields.

I thought that short-term profits were also necessary to move farmers.

So let me introduce you to another tool for lookahead.

It allows us to imagine the future by making use of our memories of the past.

I visited Fukushima Prefecture on the 6th anniversary of the 2011 Great East Japan Earthquake and Tsunami.

That's where I learned about the Onagawa nuclear power plant, which is much closer to the epicenter than the Fukushima Daiichi nuclear power plant that you all know.

However, the Onagawa nuclear power plant had become an evacuation site for local residents.

it was so safe

It wasn't even affected by the tsunami.

This was thanks to the foresight of an engineer named Yanosuke Hirai.

In the 1960s, when Hirai built the Onagawa nuclear power plant, he moved the construction site away from the coastline to a higher location and had a high breakwater built.

Because he knew that the shrine in his hometown had been damaged by a tsunami in 869.

His knowledge of history enabled Hirai to imagine things that others could not.

Now let me introduce you to another

It's about creating something that everyone can pass down together for generations.

Lobster fishers here on the Pacific coast of Mexico told me.

They've maintained the local lobster catch for nearly a century, by treating lobster as a common resource that we can all pass on to our children and grandchildren.

We carefully evaluate which lobsters we catch to ensure we don't catch all the lobsters we need to breed.

More than 30 fishing grounds in North America are doing something similar to this.

By creating long-term interests in fishing grounds, called "catch quotas," we are guiding fishers towards long-term conservation of fishing grounds, rather than just taking what's in the ocean.

There are many, many more tools for forward-looking that I want to share with you, and they're used in a lot of different ways, like investment firms looking beyond short-term stock prices, or trying to keep national elections from being swayed by the short-term interests of campaign financiers.

We need to gather as many of these tools as possible, and then rethink what we measure, change what we reward, and have the courage to imagine what lies ahead.

As you can imagine, this is no easy task.

There are tools that you can use in your own life, and there are things that you should do within your company, your community, or society as a whole.

the future is worth it

The reason I'm able to continue this effort is because of the instruments I mentioned earlier.

It's called a diluba, and this instrument was made especially for my great-grandfather.

My great-grandfather was a music and art critic who made a name for himself in India in the early 20th century.

My great-grandfather seemed to have foreseen and protected this instrument when my great-grandmother tried to pawn all his fortune.

My great-grandfather preserved the instrument by passing it on to the next generation.My great-grandfather passed it on to my grandmother, who passed it on to me.

When I first heard the sound of this instrument, I became possessed.

The voice of a wanderer in the fog of the Himalayas

I felt like I was hearing voices from the past.

(music) (end of music) This is performed by my friend Simran Singh.

When I played it, it sounded like a cat screeching, so I refrained from playing it.

(Laughter) This instrument is in my house now, but it's not mine.

I'm just keeping it for a while.It seems more meaningful to me than just owning it.

Before this instrument, I am both descendant and ancestor.

This instrument makes me feel like I'm part of a larger story.

I believe that the single most powerful way we can regain our foresight is to consider ourselves a good ancestor, not just to our own children, but to all of humanity.

Whatever your legacy, big or small, protect it, the music it makes will resonate for generations.

thank you

(applause)

Today is a special day for me. Actually, it's my birthday.

(Applause) Thank you for coming to my birthday party today.

(Laughter) But when you throw a party, there's always someone who's going to ruin it.

(Laughter) I'm a physicist.

This is Albert Einstein. He said, "Anyone who hasn't made a significant contribution to science by the age of 30 won't do it again."

(Laughter) Even if you didn't look it up on the internet, as you can see, I'm over 30.

(Laughter) Einstein basically said, I'm done as a scientist.

Luckily, I've had some luck at work.

Around the age of 28, I developed a strong interest in networks, and a few years later, I was able to publish several important papers, reporting the discovery of scale-free networks, and from there a new field called network science was born.

If you're interested, you can get a PhD in network science, in Budapest or Boston, or you can study network science anywhere in the world.

A few years later, I moved to Harvard University, first on a sabbatical, where I became interested in a different type of network: networks in the body, about how genes and proteins and metabolites interact and how they relate to disease.

This has become an important catalyst in medicine, and more than 300 researchers at Harvard University's Networked Medicine Institute (CDNM) are using this idea to treat patients and develop new treatments.

And a few years ago, I decided to take this idea and my network expertise and do something else: figure out success.

why?

Because I thought that success depends to some extent on the network you belong to, and that can be a tailwind or a headwind.

So we wondered if we could use our knowledge, our big data, our expertise to create a network that quantifies how success happens.

this is the result

It's a network of museums and galleries showing how they connect with each other.

This map that I made last year can be used to predict the success of an artist very accurately.

But as I thought about success, I realized that networks aren't everything. Success is much more multifaceted.

One of the keys to success is competence.

Let's think about the difference between ability and success.

Ability is what you do, how fast you run, what kind of pictures you draw, what kind of papers you publish, etc.

On the other hand, our tentative definition of success is how the community perceives what a person has done in their own right, how others recognize and reward it.

In other words, performance is about you, but success is about everyone.

This was an important shift in research thinking, because from the moment we defined success as a collective measure given by the community, it became measurable.

We go to school and exercise and practice because we believe that performance leads to success.

But after doing some research, I've found that competence and success are two very different things, and from a mathematical point of view, yes.

let me explain

This is Usain Bolt, the fastest man in the world.

I win almost every match I play.

We know he's the fastest in the world because we can measure it with a stopwatch.

What's interesting is that when he wins, he doesn't win by an overwhelming margin.

Only about 1% faster than second place at most.

And not only that, but he can't run 10 times faster than me, a poor runner like me.

(Laughter) Every time I measure my ability, I find something interesting: your ability is finite.

In other words, there is no big difference in human ability

They only differ within a narrow range, and you need high-precision measuring instruments to measure the difference.

It's not that you can't tell the so-so person from the top person, it's that it's very difficult to tell the top person apart.

And most of us work in fields where we can't accurately measure performance.

Our strength is finite. We are not much different in terms of strength.

What about success?

How about books by changing the field?

One way to measure a writer's success is the number of readers.

I published my last book in 2009, and I was talking to my editor in Europe, and I was wondering who the competition was.

It was full of strong men

And that week came out -- (Laughter) Dan Brown's "The Lost Symbol" and Nicholas Sparks' "The Last Song."

Comparing these books doesn't really make that much of a difference in terms of their abilities.

Right?

If Nicolas had tried a little harder, he might have been number one, because it's almost a coincidence that he's number one.

So I decided to look at the numbers, because I'm a data person.

How did Nicholas Sparks' sales go?

In its first weekend, it sold over 100,000 copies, which is a lot.

Even if it's #1 on the New York Times bestseller list, it's about 10,000 copies a week.

I was wrong

why?

Because Dan Brown sold 1.2 million copies in the same period.

(Laughter) What's interesting about these numbers is that there's no limit to success when it comes to success.

It's not something you get with your own strength, it's something that others give you.

So our perception is that there is a finite amount of what we can do, but that success is collective and unbounded.

I recently published a book that explores exactly this question.

I didn't get the time to elaborate, so let's go back to the original question, "When will success come?"

Mr. Einstein, the wreck, why did he say such nonsense? "People stop being creative after 30"

Because he looked at all the great physicists around him, the people who invented quantum mechanics and modern physics, and they were all in their twenties and early thirties and they were doing great things.

This is not Einstein's observer bias.

In the field of genius research, we've learned that when you look at the ages of all the great men of all time, whether they were in music or science or engineering, most of them were in their 20s, 30s, early 40s at the latest.

But there are problems with this genius study.

First of all, this gives us the impression that "creativity equals youth."

(Laughter) And that's also observer bias. We're only looking at geniuses, not ordinary scientists.

That's what we were trying to do, and it's important to have documentation.

Ordinary scientist like me, let's take a look at my background.

This is all the papers I've published, from my first paper in 1989 -- I was still in Romania at the time -- to this year's paper.

The vertical axis is the impact of each paper, how many times it was cited by other papers.

As you can see, my career has roughly three phases.

The first 10 years were a lot of work, but not very successful.

no one cares what i do

little influence

(Laughter) I was doing materials science at the time, and then I got into networks and started publishing papers on networks.

and published a flurry of influential papers.

I feel great, it's time to soar

(Laughter) So what about current influence?

The truth is we don't know for sure, because it takes time for the paper to actually start showing its impact.

And yet, looking at this data, Einstein and Genius's work seems to be right -- I'm the living corpse.

(Laughter) So I decided to explore this mechanism, starting with science.

When choosing subjects, in order not to be biased toward geniuses, we took every single scientist and recreated their careers, from 1900 to the present day, and identified each person's greatest accomplishment: whether they won a Nobel Prize, or not, or even their greatest accomplishment is unknown, and so on.

and made this slide

Each line is a career, and the blue dots at the top of the career are each person's greatest achievements.

The question here is when did the person make his or her greatest discovery?

In order to quantify that, the biggest discovery was looking at the first-year probability, the second-year probability, and so on.

not age

We see what we call the "Academic Age"

Count from the time you publish your first paper

Some of you are still babies

(Laughter) If you look at a graph that analyzes the years with the most influential papers,

It just turns out that the research on genius is correct.

The trend is for most scientists to publish their most influential papers in their 10th to 15th year, after which it declines.

It's going down so fast that even though I'm 30 years old now, the chances of me writing a more influential paper than my past self are less than 1%.

According to this data, I'm at that stage.

But there is a problem with this prediction.

We have not examined a control group

What would a scientist making a random contribution look like if you looked properly?

How's the scientist's productivity?

When will you write your thesis?

When we measured productivity, it was surprising to find that productivity -- the period when you were more likely to write a paper, and the period when you were more likely to make an impact in your career -- were indistinguishably similar.

Simply put, after many hypothesis tests, there is only one possible explanation: in the work of a scientist, "every paper you write, every project you do, is equally likely to be your personal best."

So discovery is like a lottery ticket.

The more you buy, the more opportunities you have

And most scientists are most likely to buy a lottery ticket in their 10th to 15th year of career, after which they become less productive.

Because I won't buy lottery tickets

It seems as if I've lost my creativity

I actually stopped trying

So when I put the data together, the conclusion was simple: success can happen anytime.

It may be the first paper, it may be the last paper

randomly distributed in project space

It's productivity that changes

Let me give you an example

Frank Wilczek won the Nobel Prize in Physics for the first paper he wrote as a graduate student.

(Laughter) Even more interesting is John Fenn, who was forced to retire from Yale at the age of 70.

When my lab closed, I moved to Virginia Commonwealth University, opened a new lab, published a paper at the age of 72, and won the Nobel Prize in Chemistry 15 years later for that paper.

You might think that science is special. Think about other fields that demand creativity.

What about entrepreneurs as a representative example?

It's Silicon Valley, it's the land of the young.

For entrepreneurs, some of the biggest awards are the TechCrunch Awards, and the average recipient of these awards is in their late 20s, early 30s.

Looking at venture capital investment destinations, there are major companies that are focusing on early 30s.

As you know, there's this "youth equals success" trend in Silicon Valley.

But when you look at the data, it's different, because starting a company isn't a success. Building a company is like productivity, and we need to look at who actually made the company successful and exited successfully.

A colleague of ours recently looked into this.

So, as I said, people in their 20s and 30s are starting so many companies, and most of them fail.

On the other hand, this graph of successful exits shows that older people are more likely to go public or sell their companies better.

This trend is so strong that people in their 50s are twice as likely to have a successful exit as they were in their 30s.

(Applause) So in the end, what's the bottom line?

It doesn't matter how old you are in creativity

What matters is productivity.

So the bottom line is, as long as you keep trying, you can -- (Laughter) succeed over and over again.

So my conclusion is simple: stop talking and go back to the lab.

thank you

(applause)

I'm sure you all played with blocks when you were a kid.

When you pick up the blocks and play with them side by side, you can develop thinking and problem-solving skills by grasping and using the space.

Spatial reasoning has a lot to do with understanding the world around us.

As a computer scientist, I focused on this interaction with objects, and with Patty's advice and with the help of Jeevan Kalanisi, I came up with the hypothesis that when we use a computer, instead of using a mouse to move the cursor that acts as a finger on the monitor in two dimensions, we can use both hands to directly pick up and arrange information.

This question fascinated me, so I created a shiftable to find the answer.

Shiftable is a thumb-sized interactive computer.

You can actually move it by hand, it can sense each other's movements, it has a screen and wireless communication.

Points are physical controls Like blocks, you can pick them up and move them.

As a tool for handling digital information, shiftables are a departure from conventional tools.

Physical manipulation and motion detection, the ability to perceive each other, increased sensitivity opens up new and exciting interactions.

I'll show you an example

This shiftable can play videos. Tilt it this way to play it, and tilt it the other way to rewind it.

Now the faces on the screen recognize each other

Show interest when placed next to

If you're surrounded, you can sense it and get upset.

You can see the movement and tilt

What this interaction suggests is that you can manipulate the data with normal actions, like pouring paint.

With three shiftables set on a paint can, when you pour color into the center shiftable, the colors mix.

If you put in too much, you can put it back a little

It can be expected to be used in education. Anyone can easily try games such as language, mathematics, and logic games, and see the results immediately.

So here I am -- (applause) programmed the Fibonacci sequence.

this is a word game

Rearrange the letters to form words, and the built-in dictionary will determine the answer.

Shuffle every 30 seconds and try another combination

(Applause) Thank you.

(Applause) We had a group of children come and try it out.

liked it

The advantage of these tools is that they don't require detailed explanations.

Everything can be conveyed just by "let's make a word"

another person is trying

The youngest participant is on the right front

just stack and play

It seems that he has his own way of having fun

Next is an anime application

I wanted to create a tool for language learning.

felix will try

To make a character appear, just lift the shiftable

make the sun appear

Video "The sun is rising"

show the tractor

Video "Orange Tractor"

You did it!

You can interact with them by shaking them side by side Video "Wan-Wan"

create your own story

Video "Hello"

You can develop the story however you like

Video "Fly Cat"

The final demo is a recently developed music sequencer and live performance tool, where shiftables are used as instruments for lead, bass, drums, etc.

Choose from 4 variations

If you apply it to a sequence, you can create any pattern you like.

Insert the sound source against the sequence piece

Do not apply reverb or filters to the sound source.

tilt and adjust

Tempo and volume apply to the entire sequence

Let's demonstrate

(music) First put the reeds in two sequences and line them up and add the reeds

put the base

(music) next percussion

(Music) Add effects to drums with filters

(music) Adjust the tempo of the song by tilting

(music) Apply a filter to change the bass

(music) You can change the order while playing

You can improvise while changing the length

Finally, tilt the volume left to fade out

(Applause) Thank you.

What I want is a human interface that matches the movements of the brain and body

Today, I've shown you one example of that design, and some applications that we're working on.

We're on the cusp of a new era of tools that allow us to interact with digital media in a way that's sensible.

thank you

I look forward to speaking with you

(applause)

my name is nanfu

"Nan" means "Man" in Chinese

"Fu" means "pillar"

The family wanted a boy who would grow up to be its pillar.

A girl was born, but she was still named Nan Fu.

(Laughter) I was born in 1985, six years before China announced its one-child policy.

Shortly after I was born, a local official came and ordered my mother to be sterilized.

My grandfather stood up to the officials because he wanted his grandson to carry on the family name.

Eventually, the parents were allowed to have a second child, but they had to wait five years and pay a hefty fine.

As my brother and I grew up, we were surrounded by only one-child families.

I remember feeling ashamed because I had a brother.

I felt like my family did something wrong with having two kids.

At the time, I didn't wonder where that feeling of shame and guilt came from.

A year and a half ago, I had my first child.

it was the best thing i've ever done in my life

Becoming a mother has allowed me to see my own childhood in a completely different light and has brought back memories of my childhood in China.

For the last 30 years, everyone in my family had to ask the government for permission to have children.

I wondered what it was like for people who lived under the one-child policy.

So I decided to make a documentary about it.

One of the people I interviewed was a midwife who took every baby in my village, and I was one of them.

At the time of the interview, she was 84.

I asked, "Do you remember how many babies you've had?"

She didn't remember how many deliveries she had.

Instead, she spoke of the 60,000 forced abortions and sterilizations she had performed.

She said that sometimes fetuses in the third trimester would survive an abortion, so they killed them after they were born.

She remembered how her hands trembled when she did it.

I was shocked to hear that

When I started making the film, I wanted it to be a simple story of perpetrators and victims.

It's about the people who implemented the policies and the people who lived under their influence.

But what I saw was different

When I finished interviewing the midwife, I noticed a corner of her house that was decorated with a hand-crafted flag.

Each flag had a picture of a baby on it.

Those flags were sent by the family she helped with fertility treatments.

She explained that she had had a disgusting number of forced abortions and sterilizations in the past, and that now she could only help families have children.

She said she was racked with guilt for helping implement the one-child policy, and hoped that by helping families have children, she could atone for what she had done in the past.

It became clear to me that she, too, was a victim of this policy.

Everyone told her that what you were doing was right and necessary for China to survive.

And you should do what you think is right for your country.

I know how powerful this message was.

It was all over the place when I was little

It was printed on matchboxes, playing cards, textbooks and posters.

All around me was propaganda glorifying the one-child policy.

[Anyone who refuses to be sterilized will be arrested.] There were also a lot of threats to disobey.

That message was so pervasive that I grew up feeling ashamed of having a younger brother.

I got to know each and every one of the people I filmed, and I saw how their souls and minds could be influenced by propaganda, how their willingness to sacrifice for the benefit of so many could be twisted into something evil and tragic.

This is not only happening in China.

There is no country on earth without propaganda.

In a society that is supposed to be a more open and free country than China, it may be harder to recognize what propaganda looks like.

It's hidden in the news reports, TV commercials, political campaigns and social media.

Without knowledge, it changes our minds.

All societies are in danger of accepting propaganda as truth, and true freedom will come in societies where propaganda no longer replaces truth.

thank you

(applause)

"Sometimes fate is like a localized sandstorm that constantly changes direction.

You change your gait to avoid it, and the storm changes its gait to follow you

You change your gait again, and the storm changes its gait as well

Again and again, like an ominous dance with death before dawn

It repeats because the storm isn't some irrelevant "something" that came from somewhere far away.

It's about you, it's about what's inside of you." This is a quote from the prologue to Haruki Murakami's Kafka on the Shore, and it captures the turmoil of the teenage protagonist's mind.

Driven by a desire to escape his overbearing father and his fate of repeating the curse of his family, he runs away from home and takes the name "Kafka" after his favorite author.

But I can't escape the memories of my missing mother and the dreams that haunt me even when I'm awake.

Published in Japanese in 2002 and translated into English three years later, "Kafka on the Shore" is an epic literary puzzle that transcends time and is filled with hidden histories, magical dark realms, and more.

It's readers' delight to discover how the pieces -- esoteric imagery, bizarre characters, and eerie coincidences -- fit together.

Kafka is the narrator of every other chapter, and the remaining chapters are centered around an old man named Satoru Nakata.

During World War II, Nakata fell into a coma and awoke without the ability to read or write, but with the uncanny ability to talk to cats.

Using the work of finding a lost cat as a clue, he sets foot on a dangerous path parallel to the story of Kafka.

Soon the prophecies will come true, doors to other worlds will open, and fish and leeches will fall from the sky.

What is it that connects these two characters? And can that power be controlled by either of them?

Encountering different worlds is a common motif in the works of Haruki Murakami.

Murakami's novels and short stories often draw fantastical connections between personal experiences, supernatural possibilities, and Japanese history.

Born in Kyoto in 1949, Murakami grew up in post-World War II American-occupied Japan.

The shadow of war is as evident in his work as it is in his life: "Kafka on the Shore" features bioweapons, soldier ghosts and dark plots.

Murakami's work blurs historical epochs and depicts multiple cultural traditions.

References to Western society are mixed with references to Japanese customs, ranging from literature and fashion to food and ghost stories.

There are many references to music, especially in "Kafka on the Shore."

A young Kafka walks out of his house listening to Led Zeppelin and Prince as he roams a strange city.

Soon he'll be hiding out in his splendid private library.

As he immersed himself in old literary works and pondered day after day about strange paintings and mysterious library directors, he befriended the librarian, who taught him classical music by Schubert and others.

This musical sensibility gives Murakami's work a more dreamy air.

Murakami is considered an artist who wields the magic of everyday life because he frequently twists the line between reality and the dream world.

This is a key feature of magic realism.

In contrast to fantasy, magic is rarely the solution to problems in these works.

It just becomes a factor that makes life more complicated.

In "Kafka on the Shore," the characters are constantly met with otherworldly events, ranging from lovestruck ghosts to whistles made of cat souls.

There are no easy answers to these challenges

Readers can only marvel at the resilience of the human spirit to deal with the unexpected.

Little Kafka seems paralyzed by alienation, but kindness and honesty lie at the core of his purpose that keeps him going.

Gradually he begins to accept the chaos in his heart.

Eventually, his experience echoes that of the reader, and the deeper you go, the more you discover.

Last summer, I got a call from a woman named Ellie.

He heard about the problem of parent-child separation on the southern border of the United States and wondered if he could do something about it.

she told me the story of her grandfather and his father

When my grandfather and brother were growing up in Poland, my grandfather's father, concerned for the safety of his sons, gave him a little money and told him to head west, walk west and west across Europe --

and the brothers walked

He walked across Europe to the westernmost point, boarded a ship, and arrived in America.

When Ellie heard stories of pre-adult youths walking south from Mexico, she couldn't help but think of her grandfather and his siblings.

Both stories are exactly the same, she said.

The brothers in this story are the "Hassenfeld Brothers" -- "Has" and "Bros" -- now Hasbro, the company that brought you, as you know, Mr. Potato Head.

But I'm not telling this story because I want to tell it.

Because this story made me think, if I were in your shoes, would I have the conviction and the courage to take my children on that journey, even though I have three pre-teens?

Even if I knew it wasn't safe where I am now, would I be able to see my children off?

A few decades ago, I started practicing as a lawyer on the southern border of the United States, dealing with asylum seekers from Central America.

And for the last 16 years, I've been a lawyer and agent for HIAS, a Jewish organization that fights for the rights of refugees around the world.

The one thing I've learned so far is that there are things that are said to bring us security and strength, but don't.

In fact, some policies do the opposite of what they were intended to do, causing a tremendous amount of needless suffering.

So why do people come to the southern border?

Most of the migrants and refugees who come to the US southern border come from three countries: Guatemala, Honduras and El Salvador.

These three countries are consistently ranked among the most dangerous countries in the world.

In these countries, it is simply impossible to be safe, much less to envision a bright future for yourself and your family.

Violence against girls and women continues

Generations of people have fled the countries of Central and South America.

For generations, refugees have come to our borders to escape civil wars in the 1980s in which the United States was heavily involved.

nothing new

The new trend is the proliferation of families, children and families showing up at border checkpoints to claim asylum.

This situation has been in the news lately, but there are a few things I want you to remember as you watch the footage.

The first is that historically, the number of people detained at the border isn't that high, and they actually show up at checkpoints themselves.

The second thing is that people came in with nothing but clothes, some with rubber sandals.

And third, America is the most powerful country in the world.

It's not the time to panic

In a safe host country, it's easy to ask legal questions, "Is it legal or illegal?"

But the people who struggle with this issue and are forced to make decisions for their families are thinking about something else entirely: How are we going to keep our daughter safe?

how to protect my son

If you want to know the immutable rule, here it is: applying for asylum is perfectly legal.

Asylum is a basic human right, both in our country and in international law.

And the evidence is -- (Applause) The basis for asylum lies in the 1951 Refugee Convention, which is the world's answer to the Holocaust, a statement that treaty nations will never send back people who would be endangered or killed.

There are several ways to enter the United States as a refugee.

One of them is the "U.S. Refugee Acceptance Program".

Through this program, the government identifies and selects refugees abroad and brings them to the United States.

Last year, the number of refugees settled in the United States was the lowest since the program began in 1980.

This year the number will be even lower

All over the world, the number of refugees is at an all-time high in history, the largest since World War II.

The second way refugees enter the United States is by seeking asylum.

An asylum seeker is a person who, when he appears at the border, claims that if he is deported, he will face persecution in his home country.

An asylum seeker is simply someone who is in the process of proving that they are accepted as refugees in the United States.

Applying for asylum is harder than ever

When people reach the border, border agents tell them that America is full and they can't even apply.

This is an unprecedented illegal response.

Recently introduced a new system -- the "Immigration Protection Procedure," which sounds like an Orwellian name -- is a system in which refugees are ordered to wait in Mexico while each application is reviewed in a court in the United States, and a decision can take months or years.

Meanwhile, the waiting refugees have no guarantee of safety, no chance to talk to a lawyer.

Our country, our government has already detained more than 3,000 children and taken them away from their parents as a means of deterring asylum applications.

Many of the children were toddlers, and there was even a six-year-old blind girl.

this situation is still going on

We're spending billions of dollars to hold people who aren't criminals in prison-like facilities.

The separation of parents and children that has become a feature of our immigration policy

It is far from the ideal image of our national identity and values, such as "shining city on a hill" or "beacon of hope."

Immigration flows have been and will always be part of this country.

The persecution, the wars, the violence that cause people to flee their homelands—increasing incentives stemming from climate change and the ability to see life elsewhere on mobile phones.

But there are ways to enable policies that align with our values, and it makes more sense given the reality of the world we live in.

The first thing to do is to avoid the poisonous rhetoric that has, for too long, been the basis of public debate on this issue.

(Applause) I'm neither an immigrant nor a refugee, but I feel like I'm being blamed because my grandparents were immigrants.

Rose, the grandfather's mother, hadn't seen her children for seven years and worked hard to bring them from Poland to New York.

Rose left my grandfather when she was 7 and didn't see her again until she was 14.

On my mother's side, my grandmother Aliza left Poland in the 1930s for Palestine, then a British mandate, never to see her family and friends again.

If we had a global coalition to deal with global migration and displaced persons, migration would become the norm, not a crisis, and it would be a powerful force for a unified global response.

Humanitarian aid is also essential

The amount of aid that our country spends on Central American countries, where refugees and migrants come from, is nothing compared to the amount we spend on crackdowns and detentions.

We can definitely create a functioning asylum system.

For a fraction of the cost of building a border wall, we could have more judges, more lawyers for asylum seekers, and a more humane asylum system.

(Applause) Then more refugees could be settled.

Let me give you an example of the decline of the refugee system. Three years ago, the United States responded to the world's largest refugee crisis by hosting 15,000 Syrian refugees.

A year later, the number of refugees accepted was reduced to 3,000.

And last year 62 people

only 62 people

While some people have taken tough lines to stop immigration and keep refugees out of the country, polls show that support for refugees and immigrants in the United States has never been higher.

Organizations like my own, HIAS, and other faith-based humanitarian organizations can help you make your voice heard when there's a law to oppose, a law to uphold, or a policy that needs scrutiny.

All you need is a phone call to take action, and if you want to help even more, you can do that too.

If you look at the prison-like detention facilities along the border where children are held, you'll probably change your mind.

One of the things that made me so happy when I spoke with Ellie on the phone was that she really understood that her grandfather's story was the same as what's going on right now, and she wanted to do something about it.

The one thing I want you to remember, and not just the backstory of Mr. Potato Head -- and of course, this is a good story -- is that nations should show their power through compassion and pragmatic response, not through violence and fear.

(Applause) The story of the Hassenfeld brothers, the story of me and your relatives, is still happening today, and nothing has changed.

The strength of a nation is found when we say to refugees, "It's okay, don't worry," instead of "Get out."

thank you

(Applause) Thank you.

(applause)

In July 1969, three Americans went into space.

They landed on the moon, they made a famous leap for mankind.

Buzz Aldrin and Neil Armstrong walked on the moon and planted the stars and stripes.

greatly honored in the United States as a great achievement

considered a tremendous feat

But they left more than just the Stars and Stripes

I also left a commemorative plaque

This plaque is so beautiful that I want to talk a little bit about it.

First, you'll notice that there are two Earths, to represent the entire Earth.

It's accompanied by a wonderful sentence, "Come in peace on behalf of all mankind."

At first glance, it just seems like a nice, poetic word, but it's written in a typeface that's just right for this moment.

It's shaped like an industrial one, and it's cleverly designed.

It's been given the best name for what's left on the moon, and it's called Futura.

I'm going to talk about fonts and why this typeface was a perfect fit.

It's not just for ceremonial reasons

I'm sure all of you have thought a lot about fonts on your way here today.

Even if you don't realize it, subconsciously, you're an expert in typography.

Type study is the study of how fonts are used, the visual aspects of the language we use.

there's something interesting

You're not a font geek like I am. Some of you may be, but it's okay to be different. I spend hours every day choosing the perfect typeface for a project, and I spend thousands of dollars every year trying to buy the typeface I'm looking for.

But you, too, actually spend hours every day scrutinizing fonts.

If you don't believe me, think about how we got here.

We've all seen the signs, and we've all decided on the screen of our phones which ones to trust and which ones to ignore.

I was evaluating the typeface.

Even when you buy a new product, you have to think about whether the item is expensive, cheap, rare, or common.

What's interesting about this is that even if it doesn't seem like anything special, you quickly realize that something is wrong.

(Laughter) The reason I love typeface research, and I love typefaces and Futura, is because there's so much to explore.

No matter which road you walk, whichever book you pick up, there's something you can read, it's full of things you like.

If you understand the history of typography and how it's changed over the years, you'll find that history unfolds before you.

This is the Futura typeface

As I said, it's the essence of modernism.

This is how modernism swept the country and became perhaps the most popular and ubiquitous typeface of the 20th century.

"Less is more," is a modernist proverb.

The same thing happened with the visual arts.

The focus was on geometry, focusing on the nature and basic shapes of things.

Futura embodies exactly this

You'll notice circles, squares, triangles included in the shapes you see in Futura.

Some shapes are based on circles, like O's, D's and C's.

Other letters look like they were drawn with a ruler and compass.

seems geometric and mathematically accurate

In fact, this technique can be seen throughout the design of this typeface.

It wasn't designed for novelty like other typefaces.

Here's the fine print, medium print, and bold print.

All typefaces of the same family are suitable for different purposes.

It was a conscious break with the past, aiming for a typeface that looked machine-made, not handwritten.

When I say "handwritten" I mean these characters

When you think of letters written with a calligraphic brush or pen, you probably think of something like this.

There are thick and thin parts

Traditional typefaces like Garamond have a vestige of the old way of doing things, where the lowercase a is tapered at the top and thick at the bottom because it mimics someone's handwriting.

But Futura, by contrast, is designed to be untouched, as if it were machine-made in the mechanical and industrial age.

It actually hides the genius of designer Paul Renner, who created this typeface in 1927.

If you look at where the curved section intersects the straight section, you'll notice that it's just a little thinner.

Using this and many other methods, the typeface was designed to be mathematically imperfect, but geometrically perfect.

Type designers do things like this every day to make their type work well.

There were other designers working at the same time in Europe and America.

There are also some great examples from Europe, trying to create something new for a new era, a new moment.

These are examples from Germany, but they may be similar to Futura, but with a different centerline height and balance.

So why did Futura take over?

If you try to read the names of the typefaces I've listed here, I'm sure you won't quite understand how to pronounce some of them.

It's not a common name

If you compare Futura to these, it's a smart marketing decision.

What's great about this name - what's special about this name is that it's hopeful, it's futuristic.

It's not the German word for "future," it's not German.

If you compare it to what's happening in America -- these are contemporary 1920s American typefaces -- bold, blush, bragadocious -- and so on.

Doesn't that sound like a perfect representation of when the stock market went haywire in the '20s?

See how innovative Futura is

Let's go back a little and talk about a real-life example of Futura being used.

This is the magazine you know, Vanity Fair.

Here's what the summer 1929 issue looks like:

Design is fine in many ways.

A typical print from the 1920s

There are photographs of important people, and here is Franklin Roosevelt, the mayor of New York at the time.

It's all centered and symmetrical.

It's a little more decorative, so it has a portrait feel to it, and it's not very modern.

Homogenous throughout

You can also see drop caps that lead to sentences

Soon, in October of 1929, all this changed when a Berlin-based designer redesigned Vanity Fair.

This is what was designed with Futura

Instead of a picture of the mayor, they're posting pictures of abstract, beautiful landscapes, in this case, the ocean.

no more drop caps

Instead of being centered, it became asymmetrical.

Turn the page and you'll see more new

Here's an even bolder asymmetry.

An illustration by Pablo Picasso moves around the page and straddles the center binding.

You can also see more innovation

Take a closer look at Futura and you might notice

Even if it's not immediately obvious, the title and description of this page don't have a single capital letter.

If that doesn't sound very innovative, look at magazines, books, websites, and you won't find many examples like this.

it's still revolutionary

Why Innovative?

If you think about what capital letters mean, they indicate something important, like a name or a title.

It could be the name of a company, or it could be a trademark.

In a way, America is actually the home of capital letter culture.

wants to capitalize everything

(Laughter) But think about how revolutionary it would be to introduce a magazine without capital letters.

Maybe it had the kind of political power that we're discussing now about pronouns.

The 1920s was just after the Soviet Union experienced a communist revolution.

For them, this meant the arrival of socialism in America.

Because all lowercase is about bringing everything down to a level playing field on an egalitarian basis.

this is still an innovative idea

Think about how often you use capital letters to give something power or prestige.

By doing this, I expressed the philosophy of Futura.

Other designers have used Futura in various ways

Others expressed a different modernism, and new illustration styles and collage-like illustrations emerged.

There were new book covers, some from Europe.

here's something interesting

In the 1920s, if you wanted to use a new typeface, you couldn't download it to your computer.

I actually needed lead type.

So Americans who wanted to incorporate this typeface into their daily practice and use it on a daily basis, whether for advertising or whatever, needed metal type.

What happened to American capitalists?

I made a lot of imitations.

It's not called Futura, but it's a two-faced typeface: Spartan and Tempo.

In fact, by the time World War II began, American corporations were trying to boycott Nazi products.

But "Please use our counterfeit products

Use 20th Century, Spartan, Vogue, Tempo

It looks just like Futura."

Most people didn't even remember the new name and kept calling it Futura.

America accepted this typeface and made it its own.

By the end of World War II, this typeface was used on everything in America: catalogs, maps, encyclopedias, charts, graphs, calendars, political documents.

So are the football team logos that came out of the league expansion.

In fact, it was used in some of the most important advertisements of the 20th century in this context.

The US government chose Futura as the typeface for new maps and projects after World War II.

It wasn't surprising, it wasn't a radical choice, it had nothing to do with communism.

But it was used in some of the most important maps, such as this 1962 Air Force military map and the 1966 map of Vietnam.

So it's no surprise that when astronauts began working on John Glenn's Mercury program, which included a manned Earth orbit, Futura was used for charts and maps.

By the time the Mercury program gave way to the Apollo program, even more things started using this typeface.

It's a safety plan, and it's used in instrument panels, it's used in navigational aids.

It was also used for diagrams explaining the mechanism of the system.

What's great about this is that it goes beyond the paper materials that are handed out.

It started being used as an interface, and it was used as a whole system for astronauts to learn how to use machines.

NASA doesn't create everything all by itself.

We had hundreds of subcontractors -- Boeing, IBM, McDonnell Douglas, and others -- that made all kinds of machines.

What if astronauts had to use different typefaces for different systems on the space shuttle?

This doesn't work well, and it's too much cognitive load to open a new system.

The use of Futura in the interface made complex tasks clearer.

They were used not only for operation buttons, but also for labels, space food bags and tool sets.

It was also used to display how to use knobs and levers.

The instructions were all printed out in Futura for those times when you really needed to make something complicated look simpler, just to make it easier to understand.

Instead of having to memorize everything in my head, I was able to have something I could refer to.

So Futura allowed me to organize and make an already very esoteric and complex system a little easier to understand.

The first and last thing that astronauts see as they enter and exit spacecraft was also written in Futura.

My favorite use of Futura is this camera.

It's a Hasselblad camera made by a Swedish company.

It's a wonderfully functional camera that some of you may have used, and it's been hailed by photographers as a great camera.

If you know anything about cameras, you've probably noticed that they've been modified.

Stickers are pasted on various places, including film canisters.

And that's what allowed NASA to put its astronauts to good use.

They're not photographers, they're not art experts.

But the reason I was able to tell them how to use this camera was because there was a label written in Futura.

In this case, Futura helped me get my device working properly.

It says not to remove the film before exposure.

If it weren't for this label, I might not have been able to create a great photo.

When you see decorative objects like this official mark and the plaque left on the moon, you can see that Futura wasn't just chosen for ceremonial reasons or design.

Futura was chosen with justifiable reason, legitimacy, and power.

There's one last thing I want to talk to you about.

Futura is telling a story

I love all typefaces because they have a story to tell.

Futura's powerful story is the story of assimilation, the story of how something is brought to America and becomes part of its culture.

This is America's light, and it's its darkness, taking something into its culture and claiming the product of digestion as homegrown.

Futura is the very history of the technology that underpinned the entire system.

Futura, a German typeface, became an American one.

So did the technology, the rockets, the scientists all came from Germany.

In a way, the German typeface on the American plaque is a perfect representation of the technological trajectory.

If you think about this story, the typefaces that reached the surface of the moon represented legitimacy and authority, and that's what the astronauts used to drive them to the moon.

thank you

(applause)

I'm Amy Padnani, and I'm editing an obituary for The New York Times.

Some friends call me "Angel of Death"

(Laughter) In fact, people ask me, "As an obituary, does it make you feel depressed to think about death all the time?"

Do you know how I will respond?

It's interesting and relatable because obituaries tell the story of a person's life, not their death.

often no one knows

For example, I recently published a tribute to the inventor of the sock puppet.

(Laughter) You know sock puppets, but have you ever wondered who invented them and what their lives were like?

The obituary is a distinctive form of journalism.

like a work of art

For reporters, it's an opportunity to weave the story of someone's life into a beautiful narrative.

Since 1851, the New York Times has published thousands of obituaries.

Leaders, celebrities, even came up with the name of a toy called Slinky.

But there was one problem

There are very few obituaries that talk about the lives of women and people of color.

That's what inspired me to start my project, "Overlooked," to tell the lives of marginalized people who don't get obituaries.

It's also an opportunity for The New York Times to rethink what it's been doing since it was 168 years old, and fill in the gaps in its history for those who, for whatever reason, weren't included.

It's an opportunity to correct the wrongs of the past and refocus society's view of who is considered important.

It's a project I came up with when I was assigned to the obituary in 2017.

Black Lives Matter, a social movement for black rights, was reaching its peak, and the debate over gender inequality was reigniting.

At the same time, I thought, as a journalist, and as a woman of color, what can I do to advance this debate?

People were coming out and talking about what they felt was unreasonable, and I was taken aback.

So I've noticed that every now and then I get an email from a reader that says, "Why aren't there more obituaries for women and people of color?"

I thought, "Really, why?"

I'm new to the department, so when I asked my colleagues, they said, "The people who are dying are people from a time when women and people of color weren't welcomed to have influence.

As generations change, there will be more obituaries for women and people of color," she said.

I could not accept such an answer at all.

(Laughter) Where the heck did all the dead women go?

(Laughter) So I started thinking about how to get obituaries.

Most of the information comes from readers.

So I thought, "Why don't you read foreign newspapers and read social media?"

at exactly the same time

So many things were going through my head, and I found a site that introduced Mary Outerbridge.

Mary was credited with introducing tennis to America in 1874.

I was surprised, "Was it a woman who introduced one of the biggest sports in America?

did anyone know that?

Did Mary's obituary appear in our newspaper? ”

Spoiler alert - not included

(Laughter) I tried to think of who else was overlooked.

So I decided to dig through the archives.

There were many things that surprised me

Ida B. Wells, the pioneering journalist who started the anti-lynching movement

Sylvia Plath, brilliant poet

Mathematician Ada Lovelace is now credited with being the first computer programmer.

So when I got back to my department, I said, "Why don't we tell them about their lives now?"

It took me a while to get your consent.

There was also concern that the newspaper would lose face because it didn't report it right the first time.

Although it was a little strange to look back at the past rather than the current news coverage.

"This is really worthwhile coverage," I said.

Once it made sense within the department, everyone went all in.

With the help of a dozen or so reporters and editors, we launched on March 8, 2018 with the stories of 15 extraordinary women.

I was aware of the department's ability to gather information, but I never expected it to have such an impact.

Hundreds of emails have been sent

The sender wrote, "Thank you for finally giving them a voice."

Another reader said, "I cried on my way to work reading the article because it felt like I was accepted as a woman for the first time."

A colleague of mine said, "I never thought a woman of color could do something like this for The New York Times." And about 4,000 of our readers also sent in tips, telling us who we had overlooked.

Among them are some of my favorites

My number one is Grandma Gatewood.

(Laughter) Granma has survived her husband's domestic violence for 30 years.

One day, her husband hit her so hard that she could not even see him. He hit her on the head so hard that the broom broke.

But when the police arrived, it was Granma, not her husband, who was arrested.

The mayor saw Granma in jail and took her home until she recovered.

One day Grandma read an article in National Geographic that no woman had ever trekked the Appalachian Trail alone.

I said, "Then I'll do it myself."

Reporters heard that old Granma was trekking through the forest.

And at the finish line, I asked Grandma, "How did you survive in such a difficult environment?"

They didn't know about her husband's violence that Granma survived.

"Forgotten People" was a huge success.

It will be broadcast as a Netflix show.

(Laughter) (Applause) I can't wait to see the show come out.

25 different publishers are talking about making books about the "overlooked people."

It's clear that this project is timely and needed.

It's also a reminder that a newspaper's job is to chronicle the world's events on a daily basis, and that we shouldn't leave out any important figures.

As I think about how meaningful it is to look back, there's one question that I've been pondering all along: "What is the future of obituaries? How can we diversify them?"

That's my starting point

I decided to gather information to answer this question.

I went to the archives, deep in the basement of the New York Times building, on the third basement level.

Also known as Morgue

(Laughter) So I enlisted the help of the archivist.

Learned about the New York Times obituary catalog

We gave it to the New York Genealogical Society to digitize it.

A programmer wrote a program to parse headlines with gender-specific words like "Mr., Mrs., Lady, Sir."

They found that between 1851 and 2017, only 15% to 20% of women appeared in obituaries.

The next thing I worked with a programmer was a diversity analysis tool.

It's a dry name, but it's a very useful tool.

It analyzes the male/female ratio of obituaries by month.

It doesn't sound like a big deal, but I used to calculate it like this.

(Laughter) I had a 30 percent goal built into the program.

Between March 2018, when I launched People Overlooked, and March 2019, my goal was to have 30 percent women obituaries.

That's a number we've been missing for 168 years, and we're happy to say that we've reached 31 percent.

(Applause) Great, but not enough.

Next target is 35%, then 40%, and eventually 50/50.

And I'd like to work with this programmer further to create a similar tool that would determine the proportion of people of color in obituaries.

Men of color also wanted to join the "overlooked people," and in a special section of the month celebrating black history, they finally did, telling the stories of about a dozen black men and women.

it was a really intense experience

Many of them were slaves or people who had left slavery for a generation.

Many of them had to falsify their pasts in order to succeed in life.

they repeatedly encountered some form of difficulty

Elizabeth Jennings, for example, fought for her right to ride a train under segregation in New York City, 100 years before Rosa Parks did the same on a bus.

It shows the long way we've come, but it also shows how much work remains to be done.

"Overlooked people" includes other marginalized people.

I recently published a tribute to computer programmer Alan Turing.

Incredibly, there had never been an obituary for this remarkable man, despite his role in breaking the German military code during World War II, which ended the war.

Instead, Turing was criminalized to death because of his sexual orientation and forced to undergo chemical castration.

Great things like this project don't come easy.

There were days when I tried so hard to convince a lot of people that it was worth launching, but it didn't work out.

There were times when I was overwhelmed by self-doubt.

There were times when I wondered if I was crazy, if I was the only one who believed this, or if I should give up.

But the response to this project made me realize I wasn't alone.

There are many people who feel the same as I do.

Well, not many people think about obituaries.

But when I dare to think about it, I realize that it's a testament to the human way of life.

It's the last chance to talk about someone's contribution to this world.

It's an example of who society sees as important.

100 years from now, some people may look to the past to see what our era would have been like.

I'm lucky that as a journalist, I've been able to use the obituary format to change existing narratives.

I was also able to contribute to encouraging long-established companies to reassess their current situation.

Little by little, I hope that as I continue this project, we will continue to refocus the way we see society, so that no one will be overlooked.

thank you

(applause)

First of all, thank you for your attention.

It feels good to be in a room full of people like this, to have everyone's attention.

Attention is a powerful feeling

I'm an actor, so my specialty is... well, I don't have anything in particular

(Laughter) But I know a lot about attention, and I've been lucky enough to get more attention than I deserve.

I'm grateful for that, because like I said, it feels great.

But there's one more thing that I feel, and fortunately, as an actor, I've experienced it many times.

Strangely enough, it's almost the opposite feeling, because it's not about getting attention.

because it's what you feel from paying attention

When I'm acting, I'm so deeply focused that I only pay attention to one thing.

As we entered the set and filming was about to begin

"Speed," "Marker," "Ready," and the director calls out "Action!"

I've heard that sequence so many times that it's become a magic spell, like Pavlov's dog reflection.

"Rotated" "Speed" "Marker" "Ready" "Action"

something happens to me unconsciously

my attention...

It narrows

Everything else in the world - all the things that bother me, the things that usually distract me, just disappear and I'm just there

That feeling is what I love so much, and I think that's what creativity is.

It is at such moments that I feel glad that I am an actor.

So there are two powerful senses.

to attract attention and to direct attention

Of course, in the last decade, new technologies have allowed more people to get their attention.

Using creative expressions, not limited to acting

Texts, photographs, drawings, music, etc.

Channels for distribution have been democratized, which in itself is a good thing.

But for everyone who wants to be creative, I can't help but wonder if it had an unintended effect, including myself.

I think that our creativity is increasingly becoming a means to an end, and that end is to get attention.

That's why I can't help but speak up, because in my experience, the more I pursue the feeling that attention gives me, the happier I am.

The more you pursue the sensations you get from being the center of attention, the more empty you feel.

(One applauds) So- thank you.

(Laughter) (Applause) This story goes back a long time.

For as long as I can remember, the first time I used being an actor to gain attention was at summer camp when I was eight years old.

I'd been auditioning for about a year, and I was lucky enough to get small roles in TV shows and commercials, and I bragged about it a lot at summer camp.

it went well at first

I got more attention from other kids because I was in "Family Ties."

This is a photo from that time

(Laughter) But then the clouds changed.

Other children started teasing me

I remember a little girl named Rocky

Her name was Rachel and her nickname was Rocky.

She's cute, she sings well, and I'm madly in love with her, so I was just bragging about it.

She turned to me and said, "I'm an attention seeker."

100% correct

But it hurt me a lot

Since that summer, I've been hesitant to be in the spotlight as an actor.

I was once asked, "Wait, why are you acting if you don't want to be the center of attention?"

At that time, I thought, "Actors aren't meant to be noticed, they're art!"

Then he said, "I understand."

(Laughter) And then Twitter came along.

Like everyone else, I fell in love, and I became a total hypocrite.

Because at that time, I was using my being an actor to get attention.

No matter how you think about it, it's not because of your witty tweets that you have so many followers.

(Laughter) "They don't follow me because I was in Batman. They like what I say. I say good things."

(Laughter) And it soon began to influence the creative process that I love so much.

still so

I try not to

Suppose you're sitting and reading a script.

You should be thinking, "How can I find common ground with this character?"

"How will the audience perceive this story?"

Instead, "What should I tweet about this movie on Twitter?"

"How should I reply? I hope it's smart enough to get a lot of retweets, just the right amount of brusqueness, not too harsh, because people don't want to get hurt or have their jobs cancelled."

The thought crosses my mind that I should read the script and try to be an artist.

But that doesn't mean that technology is the enemy of creativity.

I do not think so

technology is a tool

It has the potential to enhance human creativity like never before.

I've created an online community called HITRECORD, where people from all over the world can collaborate on all sorts of creative projects.

but ...

If we're going to talk about the dangers of creativity becoming a vehicle for attention, then we have to talk about a business model based on the attention drive of today's social media giants.

(Applause) Some might call it familiar, but it's a very practical question. How does social media, like Instagram, for example, make money?

We don't sell photo sharing services, it's free.

what are you selling?

We sell "attention"

You're selling your attention to advertisers.

There's been a lot of debate about how much time we spend on something like Instagram, but my question is, how does Instagram get so much attention?

we are giving

When someone posts something on Instagram, it gets a certain amount of attention from their followers, whether they have a few followers or millions.

The more attention you get, the more attention Instagram can sell.

It's in Instagram's interest that you get as much attention as possible.

That's why we are made to want and crave attention, and when we don't get it, we become irritable.

Instagram indulges its users in a powerful sense of attention

We used to joke, "Oh, I'm totally addicted to my phone," but this is really an addiction.

There is also scientific backing

If you're interested, I recommend books by Jaron Lanier, Tristan Harris, and Neil Earl.

But I can say this

Being addicted to attention is just like being addicted to anything else.

never fulfilled

At first, you might think, "If I had 1,000 followers, I'd feel great."

But then I said, "Well, if I get 10,000 followers," "If I get 100,000 followers, I'll feel great if I get 1 million followers."

I have 4.2 million followers on Twitter, and that doesn't make me feel good.

I'm not going to tell you how many followers I have on Instagram, because I'm really ashamed of how many followers I have, because I started after "Batman" came out.

(Laughter) When I search for other actors and see that they have more followers than I do, I feel like I'm no good.

Because follower count is what makes everyone feel bad about themselves.

Feeling inadequate is what drives you to post, to get attention, and the attention you get is what the company sells to make money.

So no matter how much attention you get, the feeling that you've finally done it doesn't make you say, "Oh, this is it."

Of course, there are many actors who are more famous and have more followers than I am, and I'm sure they would say the same thing.

If your creativity is driven by a desire to be the center of attention, it will never be fulfilled.

But I have good news

There is another powerful emotion

Your attention has other uses besides being controlled and sold by tech giants.

I was just talking about the reason why I love acting so much, it's that I can focus on one thing.

It turns out that there is a scientific backing for this too.

Psychologists and neuroscientists study a phenomenon called "flow," which is a phenomenon that occurs in the human brain when a person's attention is focused on just one thing, say, something creative, and nothing else distracts them.

Some people say they feel happier when they experience this more often.

I'm neither a psychologist nor a neuroscientist.

I believe it to be true from the bottom of my heart

It's not always easy, it's hard

Getting your attention right takes practice, and each person does it differently.

If there's one thing I can tell you to stay focused and focused, it's this: don't think of other creative people as competitors.

looking for someone to collaborate with

For example, if you're shooting a scene and you think of the other actors as your competitors, you might think, "If they get more attention than you, their performance will get more attention than you."

The performance of that scene will surely be terrible

If you think of other actors as people you can work with, it becomes easier to focus, because all you have to do is focus on them.

I don't have to think about what I do, I respond to them and they respond to me so we can be there together.

I don't want you to think that only actors on set can collaborate in this way.

Any creative space is possible.

It could be a job, it could be a hobby

You can even collaborate with people who aren't in the same place.

Some of my favorite pieces were made with people I've never met.

By the way, that's the beauty of the Internet.

If we stop competing for attention, the Internet becomes a great place to find people to collaborate with.

When you start collaborating with other people, whether it's on set or on the net or anywhere else, it's much easier to find the flow, because everyone's attention is focused on what you're building together.

You feel like you're part of something bigger than yourself. You feel like you're protecting each other from distractions. You can just be there.

at least i am

in some cases

sometimes- it doesn't always work

You can get stuck in an addictive cycle of wanting attention.

'Cause right now, I can't say that I'm not somewhere I'm saying, "Hey guys, look at me, I'm talking at TED!"

(Laughs) Yes, but somewhere.

But I truly believe that the creative process of conceiving and giving this talk has been a wonderful opportunity to focus and pay attention to what really matters to me.

So no matter how much attention I get or not, I'm glad I did it.

thank you for letting me talk to you

Thank you. That's it. You can turn your attention to someone else.

thank you

(applause)

(Playing) (Standing ovation) Thank you.

thank you very much

Am I also a TED Virgin like the previous person?

It's my first time here... what should I talk about?

(Encouraging applause) I'm very happy that Mr. Anderson invited me.

thank you for letting me play

The one I just played was composed by Josef Hoffmann.

The song is called "Kaleidoscope"

Born in Poland in the late 19th century, he is a pianist and composer who is one of the greatest pianists of all time.

There is another song I want you to hear

"Abegg Variations" was composed by 19th century German composer Robert Schumann.

Abegg is A-B-E-G-G and that's the theme of the song.

It is said to have been taken from the surname of one of Schumann's female friends.

(Laughter) But I wrote this song for my wife.

(Laughter) If you listen carefully, there are five variations based on ABEGG.

It's an old piece composed around 1834, but I hope you like it.

(Playing) (Applause) I've come to my weak point.

According to Mr. Anderson, this is about "synchronization and flow," so I thought, "Is there anything I know that these amazing people don't?"

So I decided to start talking about songwriting, where to start...

how i compose

Yamaha teaches me how to compose well

First, I create a lot of ideas for the song, and I'll play the piano as it comes to me, and then I'll choose one of them to be the main theme, which is the ABEGG I mentioned earlier.

Once you've decided on a theme, the next step is to decide which of the various musical styles you're going to use.

I'm studying the Romantic style this year.

For inspiration, I often listened to romantic composers like Liszt and Tchaikovsky.

Then I work with my teacher to create the structure of the whole song.

The teacher will help you decide on the whole piece of music.

And then we fill in the ideas, but this is hard because you have to use your brain.

And then, once the song is kind of... it's kind of solidified, I'm going to polish the little parts of the song, and then I'm going to polish the whole song.

Besides composing, what I love to do is draw.

I like drawing pictures of Japanese anime.

Anime is very popular among us teenagers.

I've noticed that there are parallels between composing and painting. The motifs and ideas of my paintings come from people.

Then decide how to draw the person

Do you draw on one page of your notebook?

Do you use a computer to draw it, or do you draw it in a notebook?

Show it flashy

And then I sketch out the characters, just like I structure a composition.

Another thing we have in common is the state of mind I'm in when I'm creating.

So even if you want to do your homework, if you don't feel like doing it, you'll end up drawing or lazing around.

Also, sometimes I can't draw or compose at all.

I can't concentrate on one thing

If you make good use of your time and do your best, you will find something.

Something magical happens, and something amazing happens all of a sudden. That's what I call "flow."

I'm at my best and I feel like I can do anything

I won't play my own song today, it's finished, but it's too long.

I'd rather improvise instead.

Here are seven sound cards, each with a note name.

I would like someone to pick 5 from here. Turn it into a melody and improvise

Applicants are here!

(Goldie Hawn comes out — applause) Nice to meet you.

Should I choose 5? Yes Please choose any 5

this and this and this

I've heard too many D's and F's

(Laughter) (\*There are some common curse words starting with D and F.) Here's one more.

Can you read them out in the order you chose them?

Okay C G B A E

thank you very much

this one?

I don't use it so it's good

(Applause) You chose C G B A E.

I'll try to put this together somehow

oh nice

Think about it... I'll make something

(Improvisation) (Standing ovation) As an encore, we're going to play Jack Fina's "Bee Boogie."

(play) (clap)

In his inaugural address, President Obama called on each and every one of us to do our best as we struggle to get out of the financial crisis we are currently facing.

But what did he tell us

Luckily, unlike the former president, he said let's go shopping.

"I want you to trust us and our country."

We didn't say, "And keep investing!"

President Obama wants to stop such childish things

appealed to human virtue

Virtue is an old-fashioned word

It may be an out of place word in a cutting-edge environment like TED.

And what does virtue mean to you? there may be people who think

Let's take one example

What's on the screen right now is the job description of a hospital janitor.

None of the items listed here are new.

It's what everyone expects: mopping the floor, sweeping, taking out the trash, organizing the shelves

You may be a little surprised by the number, but the content itself is quite ordinary.

The only thing I want you to realize is that in this very long list of jobs, there's not a single job that involves other people.

even one

Cleaning a hospital and cleaning a mortuary may not be much different.

But when a psychologist interviewed hospital cleaners to find out what they thought of their jobs, they met Mike, who told the psychologist Jones had given up mopping floors to get in shape and do some light walking in the hall.

Charlene also visited the hospital every day, and her family, who had been with patients all day, happened to be taking a nap in the waiting room.

Luke told the story of twice cleaning a young man's hospital room while he was in a coma, because the young man's father, who had been awake for six months, was furious that Luke hadn't noticed the first time he cleaned it.

This kind of behavior by cleaners and technicians and nurses -- and if you're lucky enough to be the occasional doctor -- not only makes people around you feel a little better, but it actually improves the quality of patient care and hospital operations.

Of course, not all cleaners are like this.

However, cleaners like them believe that being kind, caring, and considerate while interacting with people is an essential part of their job.

Nevertheless, there is not a single word in the job description that suggests someone else.

These cleaners have an ethical will to do what is right for others.

Beyond that, they have ethical techniques for judging what is the right thing to do.

Aristotle said, "Practical knowledge is the combination of ethical will and technology."

Just as a janitor knew how to ignore a duty to serve other purposes, a wise man knows when an exception to the rule is needed, and how to make an exception.

Like Luke swept the floor twice, the wise can improvise.

Many real-world problems are vague and the context is constantly changing.

Smart people, like jazz musicians, don't just read the notes on a sheet of music, they dance around them, creating combinations that work for the situation and the people in the room.

Smart people know how to use ethical technology for good ends.

Not to manipulate others, but to serve others

Finally, and most importantly, no one is born smart. It is made with growth

Wisdom comes from experience, but not every experience is wisdom.

You will need time to learn about the people you serve

You must be allowed to improvise with your partner, try new things, make mistakes and learn from your mistakes together.

And we also need to ask for guidance from our wise predecessors.

If you ask any sanitation worker who behaves in the manner I described how hard it is to learn the job, they'll tell you it takes a lot of experience.

It doesn't take a lot of experience to learn how to mop or take out the trash

It takes a lot of experience to learn to care for others.

TED is full of rare talent

it's scary

The good news is that you don't need to be competent to be smart.

Unfortunately, competence without wisdom is not enough.

If you are smart but lack wisdom, you will cause trouble for yourself and others.

(Applause) I believe it's self-evident for all of you.

It sounds all too obvious, but do you know this story?

It's a story about lemonade

A father and his 11-year-old son were watching a Detroit Tigers game at the stadium.

The son asked his father for lemonade, so the father went to the stand to buy it.

The only thing in the shop was "Mike's Hard Lemonade," which contains 5% alcohol.

His father, who was a scholar, didn't know that "Mike's Hard Lemonade" was alcohol.

I bought it and returned it to my son

When my son was drinking it, a security guard noticed it, called the police, and an ambulance came and took my son to the hospital.

The emergency room confirmed that no alcohol was detected in the child's blood.

The hospital tried to discharge the child, but

things didn't go so smoothly

Wayne District Child Welfare and Protection said no.

The child was sent to an orphanage for three days.

Can the child go home at this point?

The judge ruled that the father could send the child away if he stayed out.

After two weeks, the family finally returned to normal.

But the Child Welfare Department, the emergency services, the judges all said the same thing: "I don't want to do this, but I have to follow the procedures."

How do these things happen?

Scott Simon told this story on the radio, pointing out that "rules don't dictate us by themselves," but "rules take away our ability to think."

Rules are often enforced, and some say that's because past staff members were lax and sent children back to abusive homes.

It makes sense

As is often the case, when something goes wrong, we have two ways to sort things out.

one is a rule

Better Rules, More

Second is Reward

Better Rewards, More

After all, what else is there?

This is reflected in the way we are coping with the current economic crisis.

Regulation over regulation

Give a slightly different reward each time

But neither the rules nor the rewards change anything.

How can we create a rule that dictates what the cleaner did?

Do you get bonuses for caring for others?

Then it's putting the cart before the horse

If we become more dependent on rules, rules and rewards may improve things temporarily, but in the long run they create a vicious cycle that gets worse.

By relying too much on rules, we undermine our ethical skills by losing the opportunity to adapt and learn from the situation.

Also, the temptation of constant rewards robs us of our desire to do the right thing and weakens our ethical will.

And we unconsciously become involved in a battle against wisdom by relying on rules and rewards.

A few examples: The lemonade story revolves around rules and ethical techniques

a good example of fighting

You all know the nature of modern education in America, right?

This is an example of a kindergarten in Chicago

"Familiarize yourself with literature" "Think of words that start with B" "The word Bath gathers children on the carpet" "Teach them that hot water is dangerous"

Suppose there are 75 items in a 25-page picture book.

Every teacher in every kindergarten all over Chicago is saying the same words, in the same tone, on the same day.

We know why teachers need textbooks

Because we don't trust the interpretations and judgments of each teacher.

These textbooks are preventative measures to prevent failures.

In fact, the textbook saves us a lot of trouble

But textbooks make every class mediocre

(Applause) Please don't get me wrong. We need rules!

Jazz musicians need music notation Most jazz musicians use music notation

Naturally, bankers need more rules

But too many rules make it difficult for a skilled jazz musician to improvise.

As a result, you will not be able to fully demonstrate your talent. On the contrary, you will stop playing.

What about rewards?

Rewards seem to work better

If you have a motive to do something, and you give another motive to do the same thing, it seems to me that two motives are better than one.

don't you

Well, I can't say for certain

If you have two reasons, they may contradict each other rather than support each other, which will stop them from acting.

I'm running out of time, so I'll just give you one example.

Fifteen years ago, in Switzerland, we were debating where to dispose of nuclear waste.

When the referendum is held, psychologists take polls in the streets.

To someone who understands the situation well, "in your own area"

I asked, "Can we take nuclear waste?"

Incredibly 50% of people said yes

I am aware of the danger

I knew my property would go down in value.

They thought it had to be dealt with somewhere and it was a national duty.

The psychologist changed the question and asked others

I asked if I would be willing to pay six weeks' wages each year to dispose of nuclear waste in my area.

Two reasons were created: public responsibility and money.

But only 25% said yes.

Because as soon as we say rewards, instead of asking, "What is my responsibility?"

You're thinking, "What can I get out of it?"

When incentives don't work, when a CEO chases short-term profits in favor of huge bonuses and ignores the long-term health of the company, the reaction is always the same.

try to get better rewards

But the truth is, there isn't enough incentives to keep people satisfied.

Any reward system can be corrupted by malice

I need a reward. we make a living out of it

But an over-reliance on rewards robs work of ethics in two ways.

First, it demoralizes the people who do the work. Second, the work itself loses ethics.

Before he took office, Mr. Obama said, "You have to judge whether it's right or not, not just whether it's profitable or not."

Seen in the medical world

"It's not a big deal, but let's keep an eye on it to make sure it doesn't end up in court."

"To win in today's market, I've got to be someone worse than you."

So what can we do?

There's a little hope, it's about restoring ethics in work.

But there's no point in adding more ethics classes.

(Applause) If you let school teach you everything you need to know about ethics, nobody will take you seriously.

Then what should we do?

Celebrate ethical example

In fact, when you go to law school, everyone whispers about Atticus Finch, your fictional ideal lawyer.

10 year olds don't go to law school to learn about M&amp;A's

Everyone is impressed by an ethical hero

But as we grow older, it becomes harder and harder to accept that there are people we admire as ethical heroes.

please admit

Be proud of the ethical hero in your heart

Celebrate Ethical Heroes

Tell your teachers to recognize and honor you

this is what we can do

Anyone remember another ethical hero, Aaron Fewerstein, who was president of Melden Mills of Massachusetts, who created Polartec 15 years ago? The factory has burned

Protect all 3000 employees

Because if you get laid off, you're an employee on the street, and it's a huge blow to the community as a whole.

"Our company may not be as valuable on paper to the financial district as it used to be."

Ethical heroes here at TED have spoken.

There are two stories that particularly impressed me.

The first is Ray Anderson (applause), who has turned the evil empire's crew on its head, making the planet's environmental footprint as close to zero as possible.

Ray did it because it was the right thing to do.

It gave him an unexpected gift: more money.

Employees are impressed by Ray's efforts

because they know the joy of doing what is right

Willie Smits told me yesterday about the reforestation movement in Indonesia

(Applause) Willie's story is about the will to do the right thing.

A perfect example of what it can bring

A great deal of technical skill was required

I was blown away by the amount of knowledge Willie and the others needed to plan their planting activities.

But Willie stressed that the most important part of the project's success was understanding the local population.

If you're not in sync with the people you work with, you're bound to fail.

Each community has different people and lives differently, so there's no formula for understanding and support.

So there's a lot to celebrate here at TED and elsewhere.

You don't have to be a super-great hero

It's okay to be an ordinary hero

Hospital cleaners are everyday heroes to be celebrated.

Each one of us doesn't have to become a special hero, so we should work hard to become ordinary heroes.

As organizational leaders, we must create an environment in which both ethical skills and ethical will can be developed and nurtured.

Even the smartest and best-intentioned people will give up when they have to swim against the tide in an organization.

Management should never, never let any employee have a job description like that janitor.

Because any work that involves other people is ethical work.

And all ethical work requires practical wisdom

Perhaps most importantly, as a teacher, be an everyday hero and an example of ethics to those you teach.

As teachers, while we are teaching

someone is always watching

the camera is always spinning

should be aware that

Bill Gates talked about the importance of education, especially about the KIPP education program, which, as the name suggests, is "knowledge is power."

Bill talked about KIPP's education, which prepares children from poor neighborhoods for college.

Let me tell you the part that Bill didn't pick up, the kids.

KIPP realized that the only thing really important to learn was human dignity.

Children must learn to respect themselves

You must learn to respect your friends

You must learn to respect your teacher

The most important thing is to value learning

this is the essential purpose

If you hold down this, the rest will proceed naturally and easily.

In order to teach the importance of learning, teachers and other staff members must practice it every minute and every second while realizing the importance of learning themselves.

President Obama inspired human virtue

i think he is right

And the most necessary virtue is practical wisdom. Having practical wisdom allows us to demonstrate virtues such as honesty, kindness, and courage in the best possible way when needed.

President Obama also inspired hope

correct again

there's good reason to hope

I think people want to be virtuous

TED is the epitome of that

I want to do the right thing at the right time with the right motive.

This wisdom will be ours when each and every one of us begins to pay attention.

Most importantly, we need to pay attention to our actions and processes, to the structures of the organizations in which we work, to nurture the seeds of wisdom rather than crush them.

thank you very much

Thank you very much

(Applause) Chris Anderson: People are still clapping.

Barry Schwartz: Thank you very much

(applause)

It's a little embarrassing now

At the age of 17, being a creationist, I decided to go to college to refute the theory of evolution.

(Laughter) The attempt failed.

I failed spectacularly and became an evolutionary biologist.

(Applause) I'm a paleoanthropologist and National Geographic explorer who specializes in searching for fossils in caves in politically unstable and hostile conflict zones.

If I were a man instead of a woman, this would be more pick-up pick-up line than job description.

(Laughter) I don't even have a death wish.

I'm not an adrenaline junkie

I just saw a map

Front-line academic research is rarely done in politically unstable regions.

This map shows the areas that have been designated as dangerous areas by the British Foreign Office, or where information about danger has been issued.

I'm willing to be critical and say that it's a tragedy that large swathes of the planet are left without academic research.

science has a geographic problem

For paleoanthropologists, these areas are very important places in the human footprint.

You should find some wonderful fossils

But are you looking for it?

When I was in college, I learned that our ancestors spread out of Africa via the Sinai Peninsula.

As you can tell by my accent, I'm British, but I'm of Arab descent, and I look very Arab.

very passionate

Like, "You're amazing! I love you!"

But on the inside, it's British and everyone finds it annoying.

(laughs) Absolutely

My family is Arab from Yemen, and I know that crossing the Mandeb Strait is no big deal.

One simple question has always haunted me: If the ancestors of the New World monkeys could cross the Atlantic, why couldn't humans cross this narrow strait?

Yemen is much less researched than, say, Europe, it's kind of a virgin land.

But geographically, it has great discovery potential, and I had a lot of questions.

When did humans start using the Mandeb Strait?

What non-modern humans have arrived in Yemen?

Undiscovered species may be found

I'm not the only one who saw the potential in Yemen.

There were actually a few scholars who were in the area.

Political instability pulled me out, so I decided to go.

I'm looking at caves, caves were upscale residential areas at the time.

And when it comes to fossils from such hot regions, the best place to expect them to be is caves.

But things took a turn for the worse in Yemen, and just days before I was due to fly to Yemen, the civil war escalated, bombing the capital's airport and turning Yemen into a no-fly zone.

Before I was born, my parents decided to raise me as an Englishman.

I'm not involved in making the best decisions in my life.

the lucky ones in my family escaped

Those who don't get bombed, and the news they send me makes me hate myself.

This civil war has been going on for four years

It's been going on for over four years, posing a humanitarian crisis.

suffering from a man-made famine

It's not a weather famine, it's a man-made famine that could be the worst famine the world has seen in the last 100 years, the United Nations warns.

This war reinforced my belief that no one should ever be left behind.

I joined another team to pursue a new collaboration in another unstable region.

I really wanted to go back to Yemen because I have a personal connection.

So I've been wondering if there's a project we could do in Yemen to draw attention to what's going on there.

None of the ideas worked, the risks were too high, and large parts of Yemen were too dangerous for Western teams.

But I've heard that the island of Socotra in Yemen is safe once you get there.

In fact, it turns out that there are several local and international scholars who are continuing their research there.

I was really excited because Socotra is so close to Africa.

We have no idea when humans arrived on this island.

For those of you who know Socotra, it's for a completely different reason.

Known as the "Galapagos Islands of the Indian Ocean," they're one of the most biodiverse places on earth.

I've also heard that this very sensitive environment and people are at risk because of the political situation in the Middle East and the impact of climate change.

I've come to believe that Socotra is the place for me to study.

So I wanted to create a large team of different specialists.

I wanted to explore the archipelago on foot, by camel, by dhow, and check the condition of the place.

This has only happened once before, in 1999.

it's not easy

I needed a "lekkie," and for those unfamiliar with British English, a lekkie is a reconnaissance or a preliminary survey.

I've often said that going on a road trip without a recce is like going on a first date on Facebook without doing any homework.

(Laughter) It's possible, but it wouldn't be wise.

(Laughter) There seem to be a lot of people here who know.

Our recce team was no stranger to politically unstable areas. This is important, because we were going to go to the area between Yemen and Somalia. After asking for help from everyone, including the deputy governor, we were finally able to set sail.

(laughs) Do you understand?

Everyone has their own worst toilet story.

I've never swam with dolphins

I've pooped on a dolphin

(Laughter) I didn't even care that it was a pirate-infested area. Compared to the cockroach infestation, it was terrible. One day, I went inside and the floor was black, and it was moving.

(audience groaning) We only had three bunks, but we had four people on the team. On the bunk, you'd be haunted by a few cockroaches in the middle of the night.

I was the only woman on board, so I didn't end up sleeping on the floor.

On the evening of the fourth or fifth day, Martin Edstrom would look at me and say, "Ella, I think all humans are equal."

(Laughter) On the third day of our voyage on that cement ship, we began to see land.

After three years of failing, I finally saw the land of Yemen.

There's nothing quite like it when you embark on this expedition.

The moment you jump out of your jeep, or you look up from your boat, and you feel a small but certain possibility -- the possibility that you might find something that will rewrite your knowledge of who we are and where we came from.

It's a sensation like no other, one that many scientists know about, but one that's rare in politically unstable regions.

Western scientists are restricted or prohibited from working in politically unstable regions.

But some scientists specialize in the jungle.

Some scientists work deep inside deep caves.

Some scientists strap themselves onto rockets and launch them into space.

But they say it's too dangerous to work in a politically unstable region.

totally arbitrary

Everyone here must have grown up reading adventure stories.

Many of our heroes were scientists and researchers.

Science was about stepping into uncharted territory.

It was to explore the world, even if it was dangerous.

When did politically unstable regions stop being researchable?

I'm not saying that all scientists should go crazy and go to politically unstable regions.

My point is, if you've done your homework, understand the safety procedures, and been trained, don't stop anyone from doing research.

And even if there are war zones within a country, the whole country is not a battlefield.

I'm not asking you to go to a war zone.

Even in Iraq, the Kurdistan region is very different from Fallujah.

After a few months of not getting into Yemen, I joined another team.

Professor Graeme Barker's team was doing research in the Kurdistan region, excavating the Shanidar cave.

In Shanidar Cave, decades ago, a Neanderthal called Shanidar I was found.

In a program that aired on the BBC and PBS, we brought Shanidar 1 back to life.Let me introduce you to Ned, the Neanderthal.

I have a nice story about Ned.

This is what he looked like before he got hurt

We know that Ned was severely disabled.

It's a handicap that you can't live without the help of other Neanderthals.

So this group of Neanderthals, at least in this era, collectively cared for those who couldn't live on their own, just like us.

Ned is an Iraqi Neanderthal.

What else?

What scholarly discoveries lie dormant that we don't find because we don't look for them?

The region should be talked about with hope, and science and exploration can play a part.

It helps the development of the area, and discoveries like this are a source of great pride to the locals.

There's another reason science has a geographic problem.

The scholars in those regions are not empowered.

My specialty, paleoanthropology, studies the origins of humans, but it lacks the diversity of scientists.

There are a lot of scholars and students in these areas who want to collaborate, and for them safety is less of a concern than it is to us.

We tend to forget that to them it's home, not hostile territory.

Research in politically unstable regions, with local collaborators, can lead to amazing discoveries, and that's what we want to do in Socotra.

Socotra's landscape is said to be the most alien on earth, and me, Lyon, Martin, and Reese got to see it for ourselves.

please look

This place isn't hellish, it's not a ruin, it's the frontier of future science and exploration.

90% of the island's reptiles and 37% of its plants are found nowhere else on Earth, including this red resinous red bean curd.

that's not all

In Socotra, we still have people living in caves, which is very interesting, because the fact that caves are still a prime location seems to have been the case thousands of years ago.

We need fossils, stone tools, data to prove it. So our reconnaissance team has teamed up with other scientists, anthropologists, storytellers, both foreigners and locals like Ahmed, to shine a light on this place before it's too late.

We need to go back there for a big survey, because science has a geographic problem.

you are very good listeners

thank you

(applause)

The economy is a topic I prefer not to touch upon,

I'll start with that story

Let me show you the current economic situation

Here's what's behind me right now (black)

(Laughter) But let's not forget this.

All you have to think about when you're dancing in the fire is what's coming next.

So I'm going to spend the next 17 and a half minutes talking about fire, so I'm going to talk about the state of the economy, three trends, what's happened in the world of TED in the last 25 years, what's going to happen at this conference, and then I'm going to put those three trends together.

I'll also tell you what the ultimate reboot looks like.

The three trends I'm talking about are cell engineering, tissue engineering, and robotics.

And it all makes sense

But let's start with the economy

there is still a big problem

one is leverage

Because of the problem of leverage, the American financial system looks like this.

(Laughter) A typical commercial bank's leverage is nine to 10 times.

So for your $1 the bank will lend you $9 or $10.

An investment bank is usually a bank that doesn't hold money, it invests, with 15 to 20 times leverage.

Bank of America up 32x in September —

Familiar Citibank is 47 times

Aw

Bad debts will increase by more than 47 times

That's why you're making such a generous and lovely donation to these fine people.

It's kind of strange when you think about it, what do banks have in store?

(Laughter) It's not good.

On the one hand, the government is acting like Santa Claus.

Everyone loves Santa Claus, right?

But there's a problem with Santa Claus. Look at the obligatory and promised payments, and you'll find that in 1967, 38 percent were obligatory expenses, called entitlement.

And by 2007, that had ballooned to 68 percent.

Shouldn't reach 100% by 2030

However, the deadline for reaching 100% has been moved up to 2017 by making a big leap to 1 trillion here and there.

I thought my kids would take care of my debt, but what do you think?

Debt payments start

Unfortunately, when it comes time to pay the deeds, I find that Santa in the summer is unattractive.

Look

(Laughter) From the largest investor in America.

This man runs the investment company "China"

He buys the most U.S. Treasuries

I have an interview in December.

His first opinion (be kind to the sponsor)

Here's his second opinion (I'll support you if it's sustainable)

By the way, the Chinese premier repeated this story at Davos on Sunday.

This is a pretty serious problem, and if we don't start paying attention to this revenue deficit, we'll end up losing dollars.

and all is lost

let me show you what happens

It's okay to say, I'm the only one trillion dollar billionaire.

this is the real bill

This is the 10 trillion dollar bill

The problem with this bill is that it doesn't have much value.

Last week it was $8, this week it's $4 and next week it's $1.

This is what happens when everyone doesn't trust money

So the next time someone with a pretty face comes to your door and calls you Chrysler or Ford, you have to say no.

The word “eligibility” must be banished

The reason we have to move immediately is because we're out of cash.

If you look at the government budget, it looks like this.

The orange slice is the discretionary part

All other payments are obligatory

Even if we did away with the Alaskan bridge, the whole framework wouldn't change.

The first thing we have to start thinking about is putting a cap on medical spending that will eat up the entire budget if left unchecked.

I should also consider asking if I can retire a little earlier.

People aged 60 to 65 should retire as planned

Your 401(k) pension is finalized

If you are 50 to 60 years old, could you work for 2 extra years?

If you are under 50 years old, please add 4 years

This makes sense because, when our grandfathers got Social Security, they were expected to start at 65 and pay off at 68.

68 years old today is young

Military spending must also be reduced by 3% annually.

Other obligatory expenses must also be limited

I'm done with borrowing like I do now, because the interest alone fills my budget.

we need a smaller government

If we don't change it from an extension of where we are now, we'll lose the dollar and end up like Iceland.

I know what you're thinking

no matter what

Let me tell you, it snowed in Vegas this past December.

(Laughter) This is what happens when you don't address this problem.

In Japan, there was a real estate financial crisis in the late 1980s.

The stock prices of 225 large companies are a quarter of what they were 18 years ago.

What do you think will happen to the Dow 3500 in 2026 if we don't act now?

If you don't touch it, you'll get the same result.

If you don't want this Florida treasurer to be America's treasurer, you might as well get your hands on this issue.

That was the short-term story, the fire part.

It's a financial crisis

There's a second, bigger wave behind the financial crisis, and let's talk about it.

It's a much bigger wave, a much more powerful wave, a wave of technology as we know it.

Now the really important thing is that you need to cut, but you also need to grow.

Startups, in particular, account for only 0.02% of US GDP investment, but they contribute 17.8%.

The future of the American economy created by groups like the people in this room.

I have to let it grow

No need to extend bridges that reach nowhere

Now let the romance writers come in (When you think it's all over, that's the beginning)

This is when three trends come together.

The power of bioengineering, the power of tissue engineering, the power of robotics brings about a reboot.

Summarize what you have seen so far

Craig Venter showed last year that the world's first programmable cell can act like a machine, inserting DNA into it to activate it as a different species.

In parallel, MIT is working on a standard ledger for biological components.

Think of it as the radio shack of biology

If you go there, you can get proteins, RNA DNA, etc.

Then assemble various things

In 2006, I got a group of high school and college students together and started making weird little things.

It wasn't an electronic circuit, it was a living creature.

This is the first one I made

Cells have this cycle

does not grow at first

then grow exponentially

then growth stops

In order for students to know which stage the cell is in

We modified the cells to smell wintergreen (methyl salicylate) during their exponential growth.

And when the growth is over, it smells like bananas

This made it easier to determine if the experiment was working or not, and what state it was in.

After two years, we started doing more complicated things.

People from 21 countries gather and form dozens of teams

started competing

A team at Rice University has added the healthful substances found in red wine to beer.

Extract resveratrol (polyphenol) and put it in beer

One of the passing referees saw it and said, "Wow, anti-cancer beer is amazing."

(Laughter) The team from Taiwan is even more ambitious.

I tried to create a bacterium that functions like the human kidney.

I showed you this picture four years ago.

Everyone yelled in amazement that Cliff Tubin had sprouted extra feathers from his chicken.

At the time this was the coolest thing

Now we're moving from bacteria to manipulating living tissue, and here's what happened in the meantime.

I showed you this creature two years ago.

It's an endangered axolotl that lives in Xochimilco, Mexico, and it can regenerate its limbs.

Even if half of the heart is frozen, it will regenerate

Even if half of the brain is frozen, it will regenerate

Like an elected member of parliament

(Laughter) Now, regeneration no longer requires the animal itself, because mouse molars can be cloned in culture dishes.

Of course, if you can do it with a mouse in a culture dish, you can also make human teeth in a culture dish.

It's no surprise

This is how humans are born without teeth

Then give all the teeth that fell out to the fairies

grow another set of teeth

But the second set of teeth doesn't grow back when it's lost, except for lawyers.

(Laughter) But most of us actually know how to grow teeth, and we could take stem cells from adult teeth, put them in biodegradable molds, regenerate teeth, and then implant them.

can be used for other things

They found a donor who would donate a trachea to a woman in Spain who was dying of tuberculosis, removed the cells from her trachea, and applied stem cells from her to the trachea.

After regenerating my own trachea, 72 hours later, I had a transplant.

This woman is now running around with her child

Tony Atala's lab in Wake Forest is regenerating ears and even regenerating bladders for wounded soldiers.

Around Boston, there are nine women with regenerated bladders who are walking normally, much more comfortable than carrying a plastic bag for the rest of their lives.

Are you tired yet?

I mean, did you see where the story was going?

But here's where it gets interesting

Last year, this group removed all the cells from the heart, leaving only the cartilage.

applied mouse stem cells to the heart

Self-organization of stem cells started the heart

life is created

this might be the ultimate thesis

It was done simultaneously in Japan and the United States, and it was reported last year that stem cells were reactivated from skin cells.

What that means is that you can take this stuff out and create almost anything in your body.

This is starting to become the norm. Change is fast — it's moving everywhere.

The third trend is robots

For those of you who expected the robot Rosie from "Jetson" to be at home by now...

— It was the Roomba that made it happen

(Laughter) I thought we could have a robot that warned us of danger.

not realized

These robots were designed for a flat world.

Rosie runs around on her skates and the other follows the flat road.

But it doesn't work unless the world is flat, so the robots we design today are a little different.

This is Boston Dynamic's BigDog

This is a thorough awareness of the physical "Turing test".

Remember, in the "Turing test," you talk to someone over there through a wall, and if you don't know if the person you're talking to is a person or an animal, then the computer decides it's caught up with human intelligence.

This isn't a Turing test of intelligence, but it's a pursuit of a physical Turing test.

This robot is moving very fast and can carry an additional 160 kilograms of weight.

This is not the only interesting robot

A fly robot, the size of a fly, built by Robert Wood at Harvard.

Stanford also makes Stickybots

When you put these things together, when you take cells and put them together with tissue engineering and machines, it creates problems you never thought you'd see.

Several world record holders in the Special Olympics, this guy tried to run in the regular Olympics at the last Olympics.

The problem was that Oscar Pistorius was born with no bones in his lower limbs.

He came within one second of the entry standard time.

He sued for eligibility to run and won, but his record fell short.

No doubt Oscar, or Oscar's successor, will achieve the benchmark time at the next Olympics.

After that, I won't lose to anyone in the next two or three Olympics.

Combining these trends, you can see that now even people who were born deaf can gain hearing.

In my grandfather's day, we needed a big trumpet like this. In my parents' day, it was a strangely shaped box that would squeak suddenly during dinner, and now it's the size of a button you can't see.

Now, cochlear implants give deaf people hearing.

You still can't hear like we do

10 to 15 generations from now machines will be able to do it. This is the generation of machines, not the generation of humans...

After two or three years, they'll be able to hear as well as we do, and they may also be able to hear bat songs, whale talk, dog talk, and other ranges.

It will allow us to focus our hearing somewhere, to make it more or less sensitive, and do things that we can't do.

The same thing is happening with the eye.

A German group is starting to work on visual engineering to help blind people see light and dark.

still in its infancy

Someday I can see the shape

If you know color, you can literally see it, and eventually you'll see the same as we do.

In the next few years, you'll be able to see ultraviolet light, you'll see infrared light, you'll be able to focus your eyes, you'll be able to focus your eyes on very small areas.

Even what we cannot do becomes possible

These changes will come at once, and it's especially important to understand that don't just fear the fires of today, look to the future.

And of course, the future also means looking back 200 years, because next week is the 200th anniversary of Darwin's birth.

And it's the 150th anniversary of the publication of "The Origin of Species."

Darwin argued that evolution is a natural state.

Evolution is a natural state in all living things, including hominids

So far, there have been 22 species of hominids that have evolved, spread to different regions, and gone extinct.

hominid evolution is normal

So when you look at the hominid fossil record, A. erectus, Heidelberg, Flores, Neanderthals and Homo sapiens overlap each other.

It's a normal situation for different species of hominids to overlap and not have a monopoly.

To give you an idea of ​​what that means, let me briefly describe the history of the universe.

The universe was created 13.7 billion years ago, stars were formed, planets were formed, galaxies and the Milky Way were formed.

Earth formed about 4.5 billion years ago, life arose 4 billion years ago, hominids arose 0.6 billion years ago, and our species 0.015 billion years ago.

Jaan

Maybe the universe was created, and the galaxies, the planets, the energy, the dark energy, and everything else was created to create us in this room.

may be different

It may be somewhat arrogant

(Laughter) But if that's not what the universe is for, what else?

(Laughter) I think the next thing to come is another species of hominids.

I think we will transition from Homo sapiens to Homo Evoltus

I don't think it's 1,000 years from now.

Most of us have seen it, and we think our grandchildren will live through it.

Homo evoltus will directly and intentionally influence the evolution of its own species and that of others by combining the three trends I mentioned earlier.

yes this is the ultimate reboot

thank you

(applause)

Chris Anderson: Now, let's watch this wonderful speech we taped two weeks ago.

(MUSIC) José Antonio Abrau: Dear friends, ladies and gentlemen, Today I am overjoyed to receive the TED Award. This award belongs to all the best music teachers, artists and educators in Venezuela, who have sacrificed themselves and followed me faithfully for 35 years, in founding and nurturing the national system of orchestras and choirs for Venezuelan youth and children.

Ever since I was a little kid, I wanted to be a musician, and thank God, I did.

My teachers, family and society gave me all the support I needed to become a musician.

I believe that all Venezuelan children should have the same opportunities as I do throughout their lives.

From that heartfelt wish, I came to think that I wanted to make music a deep and universal reality of this country.

From the first rehearsal, I saw a bright future

Because the rehearsal seemed like a huge challenge to me.

I donated 50 scorestands for 100 children's rehearsals

When I came to the rehearsal, there were only 11 children there and I said to myself, should I drop this plan or should I have more children?

I decided to take on the challenge, and that same night I promised those 11 children that I would make this orchestra the leading orchestra in the world.

I was reminded of that promise two months ago, when a prominent music critic published an article in the London Times and asked who was the orchestral World Cup champion.

He named four of the world's greatest orchestras, fifth was the Youth Symphony Orchestra of Venezuela.

Today, I declare that art in Latin America is no longer a monopoly of the elite, but a social right, a universal right.

Child: Class doesn't matter here, no whites or blacks, no money or no money

But if you have the talent, the aptitude, and the will to enter here, you can make music with everyone here.

Stanning ovation for more than 30 minutes, how to how our music has shaken young audience from the bottom of the heart at the recent tour, Venezuela Simon Bolivar Youth Oke Shestra's performance, the children and youth rushing to the stage to get our orchestra's jacket. After the performance, I saw that the citizens went out to the city and respected the enthusiastic members after the performance.

This is not just a triumph of art, but a deep, emotional empathy between the masses of the world's most advanced nations and the young musicians of Latin American countries like Venezuela, bringing music, vibrancy, energy, enthusiasm and power to audiences.

In essence, orchestras and choirs are far more than artistic structures.

It is an example of social life and a place of learning, because singing and playing together is an intimate relationship toward perfection and refinement, pursuing a harmonious interdependence of voices and instruments while adhering to strict norms of organization and concerted action.

That's how they build solidarity and brotherhood with one another, build self-esteem, and cultivate ethical and aesthetic values ​​based on music in every sense of the word.

This is why music is so important for awakening sensibility, training values, and for young people to train young people.

Youth: I've been here all my life, music is my life.

there can be no other

music is life

JA: Every young man in "El Sistema" has his own story and all of them are very important to me.

Let's talk about Edixon Lewis

He was from the Caracas municipality and was an avid student of the double bass lessons in the San Agustin Junior Orchestra.

Through his efforts, and the support of his mother, family and community, he became a principal member of the double bass section of the Berliner Philharmoniker.

Another famous example - Gustavo Dudamel:

He started out as a boy troupe in his local boys' orchestra in Balakisimeto.

he grew up there as a violinist and conductor

He became the conductor of a junior orchestra in Venezuela and now conducts one of the best orchestras in the world.

He is the music director of the Los Angeles Philharmonic Orchestra and is currently the general director of the Venezuelan Junior Orchestra.

He used to be the conductor of the Gutenberg Symphony Orchestra and is a foremost icon for young musicians in Latin America and around the world.

The structure of "El Sistema" is based on a new and flexible management approach, tailored to the specifics of each community and region, and today across Venezuela, 300,000 low-income and middle-income children are enrolled.

It's a program of social relief and deep acculturation throughout Venezuelan society that doesn't make any distinctions, but focuses on vulnerable and at-risk groups.

The success of "El Sistema" is felt in three basic spheres: the personal and social sphere, the family sphere and the community sphere.

In the personal and social realms, children in orchestras and choirs are developing intelligence and emotion.

Music is the source of all aspects of human development, uplifting the soul and guiding the full development of the human personality.

The benefits that come from emotion and intellect are enormous - the acquisition of principles of leadership, education and training, a sense of commitment, accountability, generosity towards others, dedication, and individual contribution to the achievement of greater collective goals.

All of this develops self-esteem and self-confidence.

Mother Teresa of Calcutta insists on a quote that has always struck me: "The most dire and tragic thing about poverty is not that you have no food or shelter, but that you are nothing, that you are nobody, that you have lost your identity, that you have no public dignity."

That's why a child growing up in an orchestra or choir gives him or her a noble identity and becomes a role model in the family and community.

He will be a better student in school because he will develop a sense of responsibility, perseverance and methodicalness that will help him in school.

In the family, parental support is unconditional

Children themselves become role models for their parents, and that's very important for poor children.

Once the child finds himself important to his family, he seeks new ways to improve himself and hopes to do better for himself and his community.

He also hopes that his family will improve socially and economically.

All of this forms a constructive, upswing social dynamic.

Most of the children, as I said earlier, are among the most vulnerable segments of Venezuelan society.

That makes them willing to choose new dreams, new goals, and pushes them forward towards the opportunities that music presents.

Finally, within the realm of community, the orchestra has proven to be a space for culture and a source of creation and exchange of new meanings.

The spontaneity of music makes it not a luxury in itself, but an asset to society.

It's a child playing the violin at home while the father is doing carpentry.

A loving daughter playing the clarinet at home while her mother is doing household chores.

It is the proud and joyful unity of families in the activities of their children's orchestras and choirs.

The music itself creates a vast spiritual world that lives within the music itself to overcome material poverty.

From the moment he is taught to play an instrument, he is no longer poor.

The child started on the path to the professional level, and later became a full citizen.

It goes without saying that music is the best defense against prostitution, violence and anything else that corrupts a child's life.

A few years ago, historian Arnold Toynbee said the world was suffering from a spiritual crisis.

It's not economic or social, it's spiritual

In the face of such crises, I believe that art and religion are the only adequate answers to humanity's deepest desires and the historical demands of our time: humanity.

Education is the amalgamation of wisdom and knowledge, the means of achieving a more perfect, enlightened, virtuous and just society.

With passion and enthusiasm, we deeply admire TED's outstanding humanitarianism, breadth of beliefs, and broad and generous promotion of new values.

I hope that TED will contribute in a profound and fundamental way to the construction of a new era of musical education, in which the social, communal, spiritual and honorable goals of children and young people will become signposts and goals for a broader social mission.

May society no longer be a means of service to art, but a means of occupation by the elite, May art serve society, serve the weak, serve children, serve the sick and the weak, serve those who raise their voices for justice, through the soul of their being, through raising their dignity.

(music) (applause) CA: We'll be relaying it to Caracas.

Broadcast to Caracas and connect to Maestro Abrau's TED Prize wish

JA: Here is my TED Prize wish: I hope TED will help create and document a special training program for 50 talented young musicians, passionate about art and social justice, and passionate about bringing El Sistema to the United States and beyond.

Thank you very much

(applause)

Fifteenth-century Europeans believed they had discovered a panacea for epilepsy, bleeding, bruising, nausea, and all sorts of ailments.

This brown powder could be mixed into drinks, made into salves, or eaten plain.

The drug, called "mamia," was a ground mummified human body.

The word cannibal, which means cannibal, dates back to the time of Columbus, perhaps even a word he coined himself.

When Columbus arrived on Guadeloupe, his first report to the Queen of Spain was that the natives were kind and peaceful. But he also mentioned rumors of a group called the Caribe, who carried out violent raids and cooked and ate prisoners of war.

In response to this report, Queen Isabel allowed cannibals to be captured and enslaved.

When Columbus found that the gold he sought could not come from the island, he began to regard anyone who resisted looting or kidnapping as "Karibe."

Before I knew it, it became "Caribbean", "Kanibe", and then "Cannibal".

What was originally a derogatory term used by the settlers to demean the natives has since been applied to anyone who eats cannibalism.

While the name was born out of wild rumors, the cannibal itself is real and has a much more complicated history.

And it has taken many forms, sometimes, as in the case of "Mamia," the cannibalism is done in such a way that it is not recognizable as a body part.

There are various reasons for eating food.

Survival cannibalism is seen across cultures and times, in situations of starvation, siege attacks, and ill-fated expeditions that force you to choose between eating a corpse or starving yourself.

But there are quite a few cultures that favor cannibalism in everyday situations.

We can't say for certain just how common the practice of cannibalism was because of misrepresentations like Columbus', but there are still a few instances where cannibalism was accepted as part of the culture.

For example, cannibalism as medicine in Columbus' Europe.

Since the 15th century, demand for mamias has increased.

Initially, mummies stolen from Egypt were the raw material for the mamia epidemic, but when demand grew to the point where Egyptian mummies alone could not keep up, business seekers began mummifying corpses stolen from European cemeteries.

Mamia has been used for hundreds of years

The Merck Index, the encyclopedia of medicine, continued well into the 20th century.

And the human-derived medicines used across Europe weren't limited to ground mummies.

Liquid and powdered blood were used as medicines for epilepsy, and human liver and gallstones, oil extracted from the brain, and powdered heart were popular preparations.

In China, records of socially accepted cannibalism date back to about 2,000 years ago.

A particularly frequent cannibalism apparently involved juvenile eating -- that is, adult sons and daughters giving their own flesh to their parents.

This was usually seen as a last resort attempt to cure the sick parent, so that the child did not die, often with thigh meat and sometimes fingers.

Funeral practices involving cannibalism are also a form of culturally accepted cannibalism.

The most famous example of this is probably the Fore people of New Guinea.

In the middle of the 20th century, Foré people made a wish in advance about what they wanted at their funeral, sometimes asking their relatives to gather and eat their body when they died.

While these rituals honored the deceased, they also spread an incurable disease called kuru among the community.

Between invented stories and documented practices, there's still a lot we don't know.Cannibals don't have a unilinear history.

What we do know is that for thousands of years, people have eaten each other, sacrificed themselves, and accused others of eating people.

At the 2017 Maryland Country Fair

"I have a pig with sore eyes and a runny nose and a fever," farmers reported.

Fair attendants were concerned about the pigs, but the Maryland Department of Health was concerned about sick fair attendees.

Some of the people petted the pigs, others just walked up to the barn, and soon enough, 40 of the participants were diagnosed with swine flu.

Most animal diseases are not contagious to humans.

When a virus jumps to another host and spreads between different species, when a virus jumps to another host and spreads between different species, it can cause deadly epidemics.

So how do pathogenic viruses move from one species to another, and what makes cross-species transmission dangerous?

Viruses are parasites that infect all living things.

It survives and replicates through three stages: first contact with an infectable host, then infection, replication, and finally transmission to other conspecifics.

Let's take human influenza as an example.

First, the virus meets a new host and enters the respiratory tract.

It's not that hard, but in order to survive in a new body, you have to establish an infection before your immune response can seize it and destroy it.

To accomplish this task, viruses have evolved to have "specific interactions" with their hosts.

Human influenza viruses are coated in proteins that fit perfectly with receptors on cells of the respiratory system.

Once inside the cell, the virus adapts further, hijacking the host cell's replicative functions and replicating its own genetic material.

Here, the virus can suppress or evade the host's immune system to buy time, during which time it can replicate enough of its genetic material to infect more cells.

At this point, the flu can be passed on to subsequent victims through body fluids containing the virus.

But this simple "sneeze" gives pets, plants and even lunch a chance to come into contact with the virus.

Viruses are constantly encountering new species and trying to infect them.

usually ends in failure

because in most cases there are significant genetic differences between the hosts.

For a virus adapted to infect humans, lettuce cells are a foreign and hostile environment.

But a staggering number of viruses circulate in the environment, potentially encountering new hosts.

Viruses replicate in the millions, so they mutate rapidly and randomly.

Most mutations have no effect or even prove to be harmful, but a few viruses may become more susceptible to infecting other species.

The more time passes, or the more similar the new host is to the virus's normal host, the more likely it is that the virus will mutate and cause a successful infection, like winning the lottery.

For example, a virus adapted to mammals may only need to undergo a few "lucky" mutations to infect humans.

Or maybe a chimpanzee-adapted virus needs little mutation to infect its genetic relatives in humans.

Successful cross-species transmission requires more than just time and genetic similarity.

Some viruses can easily infect cells of a new host, but are unable to evade an immune response.

Others are difficult to attach to new hosts.

For example, it might make the host's blood infective, but not the saliva.

But after cross-species infection, viruses become much more dangerous when they reach a stage where transmission is possible.

When a virus multiplies in two hosts, it doubles the chance that the pathogen will mutate into a more contagious virus.

Each new host increases the chances of a full-blown epidemic.

Virologists are constantly looking for mutations that might allow cross-species transmission of viruses like influenza.

But it's very difficult to predict the next pandemic.

The vast diversity of viruses is just beginning to be understood.

Researchers are patiently studying the biology of these pathogens.

By monitoring new epidemic outbreaks for rapid detection, we prepare vaccines and containment procedures to prevent deadly diseases.

The largest contiguous empire in history, stretching from Korea in the east to Ukraine in the west, from Siberia in the north to southern China in the south, was built on an open plain.

In the 12th century, before the formation of the Mongol Empire, the steppes of East Asia were dotted with nomadic herds of Mongolians and Turks led by khans.

As they graze sheep, cows, yaks and camels,

They lived in felt tents and moved between summer and winter camps.

Nomadic women wielded great power, managing seasonal migrations, livestock and commerce.

The men, on the other hand, used to fight on horseback.

These nomads used to fight each other a lot,

Born into a powerful Mongolian family, Temujin changes that.

Temujin lost his father at a young age and grew up in poverty, but he formed strategic alliances with other elders and quickly rose to power.

Unlike other khans, Temujin picked his soldiers for their merits and divided the spoils equally.

What he was good at was dispersing the nomadic tribes he conquered into his own army to keep them from rebelling.

Such innovations kept him going, and in 1206 he united the people of Felt Tents to become "Genghis Khan."

The Mongolian religion is shamanism, and the world around them is inhabited by nature and ancestral spirits.

It was believed that Tengeri, the god of heaven, covered everything.

Genghis Khan believed that Tengeri wanted himself to conquer the world in his name.

If the nomadic tribes of the Mongolian Plains joined forces, this seemed possible.

Those who resisted the Mongols disobeyed Tengeri's will and deserved death.

Under Genghis Khan, the Mongols first conquered northern China and the eastern part of the Muslim world.

When Genghis Khan died in 1227, the position of God's Chosen was passed to his family, the "Golden Clan."

In the 1230s, Genghis Khan's children conquered Turkey, Central Asia, and the Rus' states, and in 1241 defeated two European armies.

In the 1250s, the Mongol Empire seized Islamic territory as far as Baghdad, and in the east it extended its territory into southern China by 1279.

Life in the Mongol Empire isn't all about war, looting and destruction.

The Mongols left the political structure of the conquered lands and left them in the hands of local rulers.

They also allowed any religion to pray for the Mongols.

They were good at capturing craftsmen, scholars and technicians, but they valued the power of experts, and they migrated them across Asia to continue their work.

The most valuable item in the empire was the gold brocade, made by weavers in Baghdad using Chinese silk and Tibetan gold.

Gold brocade was used for the clothing of the Mongolian rulers, for covering horses and for lining tents.

The Chinese gunpowder engineers were especially prized by the Mongols.

Once much of Eurasia was politically unified, trade along the Silk Road flourished and was supported by a large-scale ekiden system.

The maritime trade continued to thrive, and the dyeing of its main product was a combination of ceramics from China and blue dye from Iran.

But it didn't last long

The khan's position was not automatically passed on to the eldest brother, but was contested among siblings, uncles and cousins, with the widow of the predecessor serving as regent to his son.

In the 1260s, a full-scale civil war broke out between Genghis Khan's grandchildren over succession to the throne, splitting the empire into four parts.

In China, Kublai Khan's Yuan dynasty is remembered as the golden age of science and culture.

In Iran, the Ilkhanids developed new grandiose architecture and Persian miniature painting.

In Central Asia, the Chagatai Khanate gave rise to leaders like Timur and his descendants Babur, who built the Mughal Empire in India.

Eastern Europe was ruled by the Kipchak Khanate for a long time until the Grand Duchy of Muscovite rose to power.

The Mongol Empire lasted only a short time, but it achieved world domination unparalleled to this day.

This is the first time I've had the chance to talk about this in public, and I want to talk about the personal side of it.

World-famous baseball player Yogi Berra once said, "When life comes to a crossroads, keep going."

For more than a century, researchers have been trying to use the immune system to fight cancer, and unfortunately, it's been disappointing.

Treatments that use the immune system only worked for cancers caused by viruses, such as cervical cancer and liver cancer.

Cancer researchers have basically given up on using the immune system to fight cancer.

The immune system did not evolve to fight cancer.The immune system evolved to fight pathogens that come from outside.

The job of the immune system is to kill bacteria and viruses.

The reason the immune system struggles with most cancers is because cancers arise from their own cells, not from an outside invader.

So either the immune system doesn't recognize cancer as a problem, or when it attacks cancer, it also targets normal cells, leading to autoimmune diseases like colitis and multiple sclerosis.

Can this problem be avoided?

We've found that a synthetic immune system that recognizes and kills cancer is the answer.

That's right, the synthetic immune system.

using the results of genetic engineering and synthetic biology

We used B cells and T cells that are naturally present in the immune system.

These two types of cells are the building blocks

T cells have evolved to kill virus-infected cells, and B cells are cells that make antibodies that, when secreted, bind to and kill bacteria.

So what if we combined these two functions and reconfigured them to fight cancer?

We found that we could transfer genes encoding antibodies from B cells to T cells.

So how?

They used HIV as a Trojan horse to slip past the T-cell immune system.

We're going to create a chimera, a fantasy creature from Greek mythology that breathes fire and has a lion's head, a goat's body and a snake's tail.

An antibody from a B cell, a T cell carrier, created using the HIV Trojan horse - this paradoxical cell is called a "chimeric antigen receptor T cell" or CAR T cell.

This cell also introduces genetic information (from HIV after binding to the T cell) to activate the T cell and switch it into killing mode.

So what happens when CAR T cells are injected into cancer patients, discover and bind to tumor targets?

act like hormone-stimulated augmented killer T cells

It creates an improvised defense-building system within the body that literally divides millions of times where it attacks and kills tumors.

All of this means that CAR T cells are the first "living medicine."

CAR T cells are unconventional

It's not like the drugs you normally take. Regular drugs are metabolized after they're effective, and then you have to take them again. CAR T cells live and work for years.

We gave a cancer patient CAR T cells, and the cells survived for more than eight years.

These "custom" cancer T cells, CAR T cells, have an estimated half-life of more than 17 years.

So one dose is enough, it guards your body for the rest of your life.

It's the beginning of a new paradigm of thinking in medicine.

Now, there was one big problem with this T-cell administration.

The only T cells that work in a patient's body come from the patient's own T cells, except in identical twins.

most people have no luck

So we created CAR T cells

To find out how to grow patients' own T cells

In the 1990s, we built a solid research base.

And in 1997, we first tested CAR T cells in patients with advanced HIV infection.

And these CAR T cells survived in patients for over 10 years.

It improved the immune system and reduced the virus, but it didn't cure it.

So I went back to the lab and spent another decade and more refining the design of CAR T cells.

And by 2010, I started treating patients with leukemia.

Our team treated three patients with terminal chronic lymphocytic leukemia in 2012.

It's a form of leukemia that is incurable and affects about 20,000 adults in the United States each year.

Our first patient was a retired Marine Corps sergeant who was a prison guard.

The man had only a few weeks to live and had already paid for his own funeral.

The cells were administered, and within days the patient developed a high fever.

He developed multiple organ failure, was moved to the intensive care unit, and was in a coma.

I thought I was going to die.

But a new crossroads has emerged.

About 28 days after receiving the CAR T cells, I woke up, and when the doctor examined me, the cancer was gone.

large tumors disappeared

No evidence of leukemia was found in the bone marrow, and the first three patients were treated that year, two of them in remission, now eight years old, and one in partial remission.

CAR T cells attacked the patient's leukemic cells and eliminated 1.3 to 3.5 kg of tumor in each patient.

The patient's body became a real bioreactor for CAR T cells, producing millions of CAR T cells in bone marrow, blood, and tumor masses.

The analogy to boxing is that CAR T cells can fight well beyond their weight class.

Just one CAR T cell can kill 1,000 tumor cells.

yes it's a ratio of 1:1000

CAR T cells and their daughter cells can divide over and over again in the body until the last tumor clears.

This is unprecedented in cancer medicine.

The first two patients went into complete remission and have not relapsed to date, so I'm assuming they're cured by now.

These patients had tried all the conventional treatments, had no more options, and found themselves in the position of modern-day Lazarus.

I'm glad I stood at such a crossroads.

The next challenge was to get permission to treat a child with acute leukemia, the most common cancer in children.

The first person to do the trial was Emily Whitehead, who was six years old at the time.

For several years, even after a course of chemotherapy and radiation, the leukemia recurred.

3 times recurrence

He was seriously ill when first diagnosed.

He had been diagnosed with terminal, incurable leukemia.

The cancer had invaded her bone marrow, liver and spleen.

Then in April of 2012, I gave him CAR T cells, but he didn't show any improvement for several days.

His condition worsened and he became more critical.

Just like the prison guards in 2010, in 2012 Emily was moved to intensive care and was at the most terrifying crossroads of her life.

By the third day of administration, he was in a coma and was receiving life-sustaining treatment for renal failure, lung failure, and coma.

A high fever of 41 degrees continued for three days.

We didn't know what caused this high fever.

A standard blood test was done to look for infections, but no infections were found to cause the fever.

But in the blood, they discovered an unusual substance that had never been seen before in medicine.

They found elevated levels of a protein called interleukin-6 (IL-6) in their blood.

1000 times higher than normal

Here we come to another crossroads

By pure coincidence, one of my daughters had some form of childhood arthritis.

As an oncologist, I was looking at several experimental treatments for arthritis in case my daughter needed it.

That just so happened to become a reality when, months before Emily was hospitalized for treatment for high IL-6 levels, a new treatment was approved by the U.S. Food and Drug Administration.

It was found in my daughter's arthritis.

An antibody called Tocilizumab

It had just entered the pharmacy at Emily's hospital for arthritis.

When I found out that Emily's IL-6 was very high, I said to her doctor in the ICU, "Why don't you try some arthritis medicine?"

the doctors said i was reckless

Her fever and low blood pressure were unresponsive to other treatments, so her doctor immediately applied to the ethics review board for permission, and everyone, including her parents, agreed.

And I administered it, and the results were nothing short of amazing.

Within hours of receiving tocilizumab, Emily began to recover rapidly.

After 23 days of treatment, the cancer was declared free.

And she's now 12 and in complete remission.

(Applause) This violent response after CAR T-cell administration, accompanied by high fever and coma, is called cytokine release syndrome (CRS).

We found that almost all patients who responded to this treatment developed this condition.

People who don't respond don't show symptoms.

So instead, patients came to expect high fevers from the "worst flu of their lives" when they were treated with CAR T cells.

I expect this response because I know this is a painful test to get back to health.

Unfortunately not everyone recovers

Patients who do not develop CRS are often not cured.

So there is a strong link between CRS and the ability of the immune system to eradicate leukemia.

That's why when the FDA approved the use of CAR T cells in leukemia last summer, it also approved the use of tocilizumab to block IL-6 symptoms and associated CRS.

It's very rare in the history of medicine.

Emily's doctor put more patients through the trial, and 27 of the 30 people who were initially treated, or 90 percent, went into complete remission within a month of receiving the cells.

Complete remission in 90% of terminal cancer patients is unprecedented in more than 50 years of cancer research.

In fact, if 15% of patients are cured, drug companies will declare their experimental cancer drug a "success."

In the 2013 edition of the New England Journal of Medicine,

It was reported that an international study confirmed our results.

This led to the FDA approval in August of 2017 to treat leukemia in children and young adults.

So, as the first approved genetically modified cell therapy, CAR T-cell therapy is now being trialed in adults with refractory lymphoma.

This disease afflicts about 20,000 people in the United States each year.

The test results are equally impressive and the long-term effects are seen.

And six months ago, the FDA approved CAR T cells for treating end-stage lymphoma like this.

Now, there are many laboratories, doctors and scientists around the world testing CAR T cells for many different diseases, and it's no surprise that all are amazed at this rapid progress.

It's great to see formerly terminally ill patients like Emily returning to healthy lives.

I'm thrilled that long-term remission might actually be a cure.

I'm also worried about the cost of treatment.

It costs up to $150,000 per patient to make CAR T cells.

Add to that the cost of treating CRS and other complications, and that can add up to about a million dollars per person.

When treatment fails, the cost is even greater.

Currently, even incurable cancer treatments are expensive and cause patients to die.

So, of course, we want to advance our research to make treatment more efficient and affordable for all patients.

Luckily, this is an area of ​​new innovation, and like many other new treatments and procedures, prices will come down as the efficiency of commercialization increases.

When I think about all the crossroads that have led to CAR T-cell therapy, one thing is very important.

Big discoveries like this don't happen overnight.

CAR T-cell therapy has come to this point after 30 years of many setbacks and surprises.

In a world of immediate gratification and immediate results all the time, it takes perseverance, foresight and perseverance for scientists to get through all of this.

Scientists understand that crossroads aren't always a dilemma or a detour.

thank you

(applause)

One peaceful Tuesday, in the superconductor lab, a system bug hit us, and we got into a bit of trouble.

Right now, our research team is trapped in 11 extradimensional pocket spaces.

If we're lucky enough to have an experimental teleportation robot in the works, and we can figure out a way to take advantage of its quirky capabilities, we might be able to put everyone back together.

Over an interdimensional radio, an engineer explains, the robot can teleport to the extradimensional space where everyone is trapped, but where it flies is totally random.

The robot has two levers and one big button.

When the robot appears, switch the position of one of the levers from A to B or B to A. The robot will record your location and teleport you randomly to some other place in 11 spaces.

When the robot reappears, you have to pull the lever before teleporting.

When someone pushes a button, the robot will return everyone who pulled the lever back to their original dimension.

Those who didn't pull the lever will be forever wandering in another dimension.

The problem is making sure everyone pulls the lever before someone pushes the button.

Now that we can talk to each other over interdimensional radio, let's put together a plan, because the robot's teleportation technology disrupts all communications once it arrives.

You can't have a robot carry a message or carve notes into a super-strong alloy body.

The only way to convey information is by flipping a lever or pressing a button.

What kind of strategy will get everyone back to normal?

Pause the video here if you want to think for yourself

3 seconds to answer 2 seconds to answer 1 second to answer It would be nice if we could show who the robot came to by combining various lever positions.

there are only two levers

That would only give you four combinations, far too few to communicate with 11 people, and you'd have to switch one lever to make the robot fly to the next.

there must be some other way

The key point is that not everyone needs to know who the rocket is visiting.

If one person takes responsibility for pressing the button beforehand, only that person needs to know who the robot has visited.

In fact, you don't even need to know who you've visited...just how many people you've visited.

Please run for the role of pressing the button at the right time and tell all your friends what to do next.

The strategy is simple. The left lever is used to count visits. The right lever has no meaning.

Everyone but you, pull the left lever from A to B. Just once.

If the left lever is already lowered when the robot appears, or if you have already lowered the left lever, please move the right lever.

During this time, you're the only one who can return the left lever from B to A.

This way you can count how many people the robot has visited.

Everyone must lower the left lever only once, and you're the only one who raises the left lever.

This way, the 10th time the robot comes to you with the left lever down, you know it's visited all 10 people except you.

Now you can safely press the button and put everyone back in place.

It might take a while, but it looks like the robot needs to teleport about 355 times, but that's better than leaving someone behind, isn't it?

One by one, the members of the research team returned to their original dimension.

The operation was a great success.

Well I guess...

Nuor Inayat Khan was on the run for his life.

She had been imprisoned as an Allied spy, but thanks to a screwdriver, she and two other prisoners were back under the stars in Paris.

When she started running, the events leading up to this flashed through her mind. Born in Moscow in 1914 to an Indian-Muslim father and an American mother, Noor grew up in a truly peaceful home.

My parents were Sufi pacifists who believed in the power of music and compassion.

The family moved to Paris, where Noor studied child psychology and published children's books.

But with World War II, everything changed.

In May 1940, in the face of the German occupation of Paris, Noor and his brother had to make a difficult choice.

As pacifists, they believed that it should be resolved non-violently.

When he saw the devastation sweeping through Europe, he decided not to stand by.

Noor traveled to England to join the Women's Auxiliary Air Force and train as a radio operator.

Focused on radio communications and Morse code, she didn't realize she was being watched by a secret organization.

A "Special Operations Executive" was set up to sabotage German forces in Nazi-occupied countries.

Trained as a radio operator, familiar with Paris, and fluent in French, Noor was an attractive recruit.

In my interview, I was warned that radio communications is one of the most dangerous missions in the intelligence field.

A radio operator must carry a conspicuous transmitter in enemy territory, and if she is captured by the enemy, intelligence agencies will not protect her.

Noor immediately accepted the mission.

Determined to stick to his pacifist principles as best he could, Noor had to learn the art of spying.

I learned how to contact the intelligence network, how to unlock it, how to withstand interrogation, how to shoot.

In June of 1943, he landed in Angers, south of Paris, and headed for Paris armed with a fake passport, a pistol and little money.

But the intelligence network has collapsed.

Within weeks of starting the mission, all of our fellow spies were arrested, and Noor was recalled.

But she persuaded her superiors to stay, which meant she could do the work of six radio operators by herself.

Over the next several months, he tracked down the French resistance, delivered supplies, reported Nazi activity to London, and arranged safe passage for Allied forces.

This activity was essential to building the network of the French resistance and the Allies, and ultimately ending the war.

Because of her quick wit and charisma, we successfully interrogated her many times.

At a Gestapo checkpoint on a train, I described it as a "projector." When I was accused of installing an antenna, I pretended to be a radio music lover and had someone help me install the cable.

A four-month mission, with brilliant resourcefulness and covert operations, did not fail.

But jealousy of her charm proved fatal.

In October 1943, a colleague's sister who was enamored by an agent who loved Noor sold her place to the Gestapo.

Noor refused any information and focused on trying to escape.

He smuggled a screwdriver from a jailer, removed a skylight, and escaped into the night.

But as the prisoners tried to escape, an air raid alarm went off and they were spotted by their pursuers.

Noor was recaptured and sent to a German concentration camp.

He was then deported to the Dachau concentration camp.

Tortured, dispossessed, and alone, Noor kept his secret.

Before his execution, he is said to have yelled, "Freedom!" For his noble sacrifice, Noor is hailed as a hero who fought in secret on the front lines, paving the way to freedom without hurting anyone.

Twenty years ago, we introduced a system called the Friday Democrat Assembly.

Every Friday at 7:00 p.m., the family gathers for a formal meeting to discuss current family issues.

This meeting was moderated by one of the parents and had a secretary.

The meeting had two decisions.

The first is that you can speak openly and freely.

When we children criticize our parents, we are never seen as disrespectful or disrespectful.

The second is the Chatham House Rule, which states that whatever is said in a meeting must be kept within that meeting.

(Laughter) The topics discussed at that meeting changed from week to week.

In one week, we talked about what we wanted to eat, when we should go to bed, and how we, as a family, could make things better. In another meeting, we talked about what happened at school, how we resolved the conflict between the siblings.

At the end of each meeting, we came to an agreement or decision that was valid until at least the next meeting.

So you could say I was raised to be a politician.

By the age of six or seven, I had mastered the art of politics.

negotiating, making compromises, and fighting with other politicians

(Laughter) I even tried to undermine the political process once.

(Laughter) This meeting seems calm and orderly and democratic, doesn't it?

But that wasn't always the case.

Because it's an open and free space to comment, debate, and criticize, sometimes the debate gets really heated.

One meeting put me at a real disadvantage.

I was about 10 years old at the time, and I did something really bad in school, something I can't say here. (Laughter) But my brother decided to bring it up in a conference.

I couldn't justify myself, so I walked out of the meeting and boycotted the system itself.

I literally wrote an official document, declared a boycott, and handed the document to my father.

(Laughter) I thought that if I stopped attending these meetings, the system would collapse. (Laughter) But my family kept the meetings going and often made decisions that I didn't like.

But I couldn't appeal because I wasn't at the meeting, so I didn't have the right to object to the decision.

Ironically, when I was about 13, I had to attend one of the conferences again, after a long boycott.

Because I had an issue that only touched me and no one else in my family picked up on it.

The problem was that I was the only one to wash the dishes after dinner, and my brothers didn't have to do anything to clean up after dinner.

I felt this was unfair, unfair and discriminatory, and I wanted to discuss this at the conference.

As you can see, it's been a practice in many societies for a long time to make domestic work a female role, and a 13-year-old girl needed some space to challenge it.

During the meeting, my brothers said, I've never heard of a man washing the dishes, so why is our house different?

But my parents agreed with me and said my brothers should help me too.

But I couldn't force my brothers, and the problem continued.

Since my problem was not resolved, I decided to go back to the meeting and propose a new way of doing things that would be fair to everyone.

Instead of one person washing the dishes for the whole family, each member of the family washes their own dishes.

As a token of his goodwill, he offered to wash the pot as well.

So my brothers could no longer argue that it wasn't their job as men to wash the dishes and clean up after themselves, because the way I proposed was for each member of the family to clean up after themselves and take care of themselves.

Everyone agreed with my suggestion, and it's been our family's way of washing dishes for a long time.

What I've just told you is a family story, but it's also a purely political one.

Every part of politics involves decision-making, and ideally the decision-making process should include people of different backgrounds, interests, opinions, genders, beliefs, races, ethnicities, and ages.

And they should all have an equal opportunity to contribute to the decision-making process and be involved in decisions that directly or indirectly affect their lives.

That's why I find it hard to understand when young people say, "I'm too young to be involved in politics or have political opinions."

It's the same with women saying, "I don't want to get involved in politics because it's a dirty world." I'm concerned that the concept of politics and political participation is polarizing in many parts of the world.

I want to ask young people, women, ordinary people: Is it really okay to be politically indifferent or non-participating?

Politics is not just activism

Being aware, staying informed, wanting facts,

Cast one vote if possible

Politics is a tool for organizing ourselves as groups and societies.

Politics touches every aspect of your life, and if you don't get involved in politics, other people decide what you eat and where you have access to health care.

Others may also label you as a criminal based on your race or ethnicity, or add you to terrorist lists based on your religion or nationality.

If you still think you're a strong, independent person, unaffected by politics, think again.

I am speaking to you as a young woman from Libya, my country is in the midst of a civil war.

After more than 40 years of authoritarian rule, political participation by women and young people is neither possible nor encouraged.

Most of the political debates that have taken place in the last few years, even those convened by foreign powers, have been by middle-aged men only.

But even in places like Libya, where political systems are broken and seemingly functioning, including international institutions, the mechanisms for making political decisions today are not built by the people for the people, but by the few for the few.

And that minority has historically been almost exclusively male, and they create laws, policies, and mechanisms of political participation based on one group's opinions, beliefs, worldviews, dreams, and aspirations, while everyone else is excluded.

And we've been told, "What do women and children and people of color know about politics?"

If you're young, and in many parts of the world, women too, you'll hear veteran politicians say, "But you don't have enough political experience."

When I hear that, I wonder what kind of experience I'm talking about.

Experience in a corrupt political system?

Or experience in war?

Or are they referring to the experience of prioritizing economic benefits over the environment?

If you say it's a political experience, the answer is yes -- (applause) we women and young people have no political experience at all.

But maybe politicians aren't the only ones to blame, because ordinary people and many young people don't care about politics either.

Even people who care about politics don't know how to participate.

This has to change, here's my suggestion

We need to teach people early on how to make decisions and participate in politics.

Each family has its own little political system, which is usually not democratic because parents make decisions that affect the whole family, and children have little say.

Similarly, politicians make decisions that affect the nation as a whole, and citizens have little say.

We need to change this, and to make this change work properly, we need to teach people that political, national, and global issues matter as much to each of us as personal and family issues --

If you want to make this happen, my recommendation is to try the democratic family council method.

Because it enables children to exercise their power and make decisions from an early age.

Politics is about having conversations, including difficult arguments to guide decisions.

To have a discussion, you have to participate, and you can't abstain, as I did when I was a kid.

Involving children in family discussions helps them grow up and learn how to engage in political debates.

And, more importantly, it will help others to participate.

thank you

(applause)

October 17, 2009 Maldivian President Mohammed Nasheed did something peculiar.

We held a ministerial meeting underwater.

With ministers, we literally scuba dived under the sea to warn the world that if we don't stop global warming, the Maldives will be under water.

Now, I don't know if his message got through to the world, but it did.

viewed as a political performance

I'm a politician and I know this sort of thing

To be honest, the Maldives is a long way from where I live, Bhutan, so I didn't lose sleep worrying about the perilous fate of its people.

Just two months later, we saw another political performance.

Now the Prime Minister of Nepal held a ministerial meeting on Mount Everest.

The prime minister took all his ministers to Everest base camp to warn the world that the Himalayan glaciers were melting.

As for whether my heart was pounding because of that,

of course

I live in the Himalayas

But I couldn't sleep because of his warning

it's not

I don't want political performances to cause me to lose sleep and lose my youthfulness.

(Laughter) Now, let's move forward in 10 years.

I saw this report in February of this year.

In short, the conclusion presented here is that one-third of the glaciers in the Hindu Kush Himalayas could melt by the end of this century.

But even that is if we keep the temperature rise below 1.5 degrees Celsius above pre-industrial levels.

Otherwise the glacier will melt at a much faster rate.

1.5 degrees Celsius — "No way," I thought.

Even the ambitious goals of the Paris Agreement seek to limit global warming to 2 degrees Celsius.

1.5 degrees Celsius is the so-called "best case scenario."

"It can't be that way," I thought.

The Hindu Kush region of the Himalayas is the third largest reservoir of ice in the world after the Arctic and Antarctic.

That's why it's called the "third pole"

There is a lot of ice in this area

Yes, the glacier, it's melting.

everybody knows that

I also visited our glaciers and saw them with my own eyes.

Surely the glacier is melting

I know it's fragile

"But nothing can be that fragile," I thought.

But what if it's true?

What if glaciers melt much faster than predicted?

What if it's much more fragile than you thought?

As a result, what happens when glacial lakes -- lakes that are formed when glaciers melt -- rise and burst under the pressure?

What if all that water rushed into other glacial lakes and caused even more violent floods?

If that happens, an unprecedented flash flood will occur in our country.

will suffer devastating damage

it will be a disaster

It can literally destroy our country, our way of life, our way of life.

I couldn't take my eyes off this report, even though I was unfazed by the political performance.

The report was compiled by a Nepal-based agency called the International Center for Integrated Mountain Development (ICIMOD).

Scientists and experts have been studying our glaciers for decades, and the reports kept me up at night, racking my brain over the bad news and wondering what it meant for our country and our people.

So after a few sleepless nights, I went to Nepal and visited ICIMOD.

There was a team of very talented and dedicated scientists there, and they said,

First, the Himalayan Hindu Kush glacier has been melting for some time now.

For example, this glacier

This one is on top of Mount Everest

As you can see, the once-great glaciers have already lost a lot of their ice.

Second, glaciers are now melting at an accelerating rate, and in fact, so rapidly that even 1.5 degrees of warming would melt a third of the glaciers.

If the temperature rises by 2 degrees, half of the glacier will disappear.

If this situation were to continue, two-thirds of our glaciers would disappear completely.

Third, as the earth warms, the mountains will have more rain and less snow...

Unlike snow, rain melts ice, which worsens glacier conditions.

Fourth, pollution in the area is increasing the amount of black carbon deposited on the ice.

black carbon is like soot

It absorbs heat and accelerates the melting of glaciers.

The bottom line is that glaciers are melting more and more, and this is being accelerated by global warming.

What is this?

And that means the 240 million people who live in the Himalayan Hindu Kush region -- Afghanistan, Pakistan, India, China, Nepal, Bangladesh, Myanmar and my beloved country, Bhutan -- will be directly affected.

As glaciers melt, rain increases and snow decreases, there will be big changes in the movement of water.

More extreme weather events More heavy rains, flash floods and landslides More frequent glacial lake deluges

That would unimaginably destroy the environment in areas already home to some of the poorest people on the planet.

But it's not just the immediate community that is affected.

People living downstream are also severely affected.

This is because the land's 10 major rivers originate in the Himalayas and Hindu Kush mountains.

These rivers provide essential water for agriculture and drinking water to the more than 1.6 billion people who live downstream.

That's one-fifth of all humans

That's why the Himalayas and Hindu Kush are sometimes called "the water tower of Asia."

But when the glaciers melt and the monsoons intensify, it goes without saying that these major rivers will flood, floods will occur when water is not needed, and droughts will occur quite often when water shortages are severe.

In short, Asia's water towers would be destroyed, devastating one-fifth of humanity.

Should the world care about this?

For example How about you?

Remember, it didn't bother me when I heard that the Maldives would sink under the sea.

This is the heart of the matter

lack of interest

The problem is that you don't care until it affects you.

we know climate change is real

Faced with a dramatic change, and that it is approaching

I know

But most people act as if everything is normal.

We have to care, all of us. Even if we can't care about the people affected by melting glaciers, we should at least care about ourselves.

Because the Himalayan Hindu Kush Mountains - the whole area is like the pulse of the earth.

If that area gets sick, the whole planet will eventually suffer.

And right now, at this very moment, the glaciers are melting rapidly, and the region is not only sick, it needs help.

How will it affect the world?

One clear scenario is the political instability that tens of millions of climate refugees can cause, forced to migrate as a result of water scarcity, water depletion, or the destruction of livelihoods by melting glaciers.

Another scenario we shouldn't underestimate is the potential for water conflicts and political instability in three nuclear powers -- China, India and Pakistan.

What's happening in our region is so serious that it's reason enough to create a new intergovernmental agency.

As a local, I'm here today to propose the creation of the Third Polar Council, a high-level intergovernmental organization with a single mandate to protect the world's third largest ice reservoir.

The Third Polar Council is made up of all eight countries in the region as members, and each country is on an equal footing. The Council could also include other non-voting members who represent the region or other countries with vested interests in the region.

But in the first place, the goal is to bring all stakeholders together and work together.

Working together to monitor the condition of glaciers, working together to develop and implement policies to protect glaciers, and to protect the millions of people who depend on them.

We have to work together, because in the "think globally, act locally" mindset,

because it doesn't work

tested in Bhutan

We acted on a "local scale" at great cost.

While individual efforts on the ground will continue to be important, they alone will not be enough to meet the onslaught of climate change.

To fight climate change, we must work together

We have to think globally and act locally.

The whole region must come together, work together, fight climate change together, and make the voices of the people heard together.

That includes India and China.

they should get serious too

I need you to lead the fight to protect the glacier.

To do that, these two great nations must reduce their own greenhouse gas emissions, control their own air pollution, and lead the fight.

lead the global fight against climate change

We have to approach it with a new sense of urgency.

Only then, hopefully, will my region and the rest of the glacier-dependent regions have a chance to avoid a catastrophe.

don't have time

we must act together now

If we don't, we'll have a spectacular backdrop for the next Nepalese ministerial meeting on Mount Everest.

may have changed

And if that happens -- if our glaciers melt, sea level rise will sink the Maldives.

They've managed to hold an underwater ministerial conference to send out an SOS to the world, but it's only through their islands that the country itself can survive.

The Maldives are still far away

The Maldives Islands are far from my country

But now I can't take my eyes off what's going on there

thank you very much

(applause)

Do you feel like you're stuck in a broken economic model?

This economic model is ruining a vibrant world and threatening the lives of generations after us.

It alienates billions of people, while making a handful of people incredibly rich.

Divide us into winners and losers, and blame themselves for the misfortunes of the losers.

This is neoliberalism, and this zombie doctrine seems to never die, no matter how thoroughly discredited.

Maybe you thought the 2008 financial crisis destroyed neoliberalism.

After all, neoliberalism has laid bare its core characteristics: the deregulation of business and finance, the dismantling of public protection, the mechanics that keep us all in competition with each other, well, it's a little flawed.

In fact, in theory, it collapsed.

But neoliberalism still rules our lives.

why?

I think it's because we haven't yet created a new narrative to replace neoliberalism.

Stories are our guideposts for traveling the world.

Storytelling allows us to interpret the world's complex and contradictory signals.

When we want to understand something, we're looking for narrative truth, not scientific reasoning.

Does what we hear reflect the behavior we expect of humans and the world?

Does it make sense?

Is the story moving forward as it should?

We live with stories, and facts and numbers, no matter how important they are -- I'm an empiricist, so I believe in facts and numbers -- don't have the power to reject compelling stories.

Only story can replace story

You can't take someone else's story unless you give them a new story.

And it's not just a generic story that fits us, it's a story with a particular structure.

We're repeating a lot of basic plots, but in politics, one plot turns out to be incredibly powerful, and I call it the story of recovery.

This is the story

The world is afflicted with turmoil, turmoil caused by mighty and diabolical forces, harming the people.

But a hero will rise against this chaos, fight that mighty force, overcome great difficulties, overwhelm him, and restore harmony to the world.

you've heard this story

it's a bible story

This is the story of Harry Potter

This is the story of The Lord of the Rings.

This is the story of The Chronicles of Narnia

But it's also the story that has accompanied nearly every change in politics and religion for thousands of years.

In fact, I might even go so far as to say that without a powerful new story of recovery, there will be no political or religious change.

it's so important

After the "laissez-faire" economy caused the Great Depression, John Maynard Keynes set out to write a new economy. What he did was tell a story of recovery.

The world is in turmoil!

(Laughter) The chaos of a powerful, diabolical economic elite has led to a monopoly on the world's wealth.

But the hero of this story, the "helper state" supported by working-class and middle-class people, will rise to the challenge and fight that mighty force by redistributing wealth, and by taxing public goods, will generate income and jobs, and restore harmony to the world.

Like all good recovery stories, this one struck a chord with a wide range of political philosophers.

Democrats, Republicans, Labor, Conservatives, left and right, all have become Keynesian.

Then, in the 1970s, when Keynesianism ran into trouble, neoliberals like Friedrich Hayek and Milton Friedman emerged with their new story of recovery.

what's the story

(laughter) The world is suffering from chaos!

It's caused by the mighty, diabolical forces of the centralized state, where state control is destroying freedom, individualism, and opportunity.

But the hero of this story, the entrepreneur, will fight that mighty force, put the nation back together, and restore harmony to the world by creating wealth and opportunity.

This story also resonated with a wide range of political ideologies.

Republicans, Democrats, Conservatives, Labor, they've all become neoliberals.

It's the opposite story, but the structure of the story is exactly the same.

Then, in 2008, the neoliberal narrative collapsed, and the narratives offered by the opponents were --

There was no

There was no new recovery story!

The best they could offer was watered-down neoliberalism and reheated Keynesianism.

this is why we are stuck

Because there is no new story, we are stuck with the old story that has been defeated, and we repeat the defeat of the old story.

Despair is what we fall into when our imagination is defeated.

Without stories to explain the present and chart the future, hope is lost.

The defeat of politics is really the defeat of imagination.

Nothing will change without a recovery story that can show us where we are going, but with such a recovery story, almost everything can change.

The stories we have to tell are those that cross political partisan lines and appeal to the widest possible audience.

And it should speak to your deepest needs and desires.

It should be simple, straightforward and grounded in reality.

All at once sounds like an unreasonable order.

But I believe that the West really wants to tell stories like this.

Over the past few years, we've had some amazing discoveries coming from different fields of science -- psychology, anthropology, neuroscience, evolutionary biology -- and these discoveries have turned out to be really amazing.

Sure, we all have a selfish part, a greedy part inside us, but for most people, this is not the dominant value.

We've also come to realize that we're great cooperators.

Weak and slow compared to the creatures that prey on us and most of our prey, we survived on the African savannah because of our incredible ability to engage in mutual assistance, and this urge to cooperate is hardwired into our minds through natural selection.

This is the core and important fact about humans: our altruistic and cooperative behavior is amazing.

But something has gone terribly wrong

the world is suffering from turmoil

(Laughter) Our good nature has been thwarted by many forces, but I think the most powerful of these is the political narrative of our time, which commands us to live in extreme individualism and mutual competition.

Fight each other, fear each other, make each other suspicious

divide society into individual

It weakens the social bonds that make life worth living.

In the void that has arisen, violent and intolerant forces thrive.

We are a community of altruists, but our rulers are antisocial personalities.

(Applause) But it doesn't have to be this way.

Not at all, because we have this wonderful power of togetherness and belonging, and by awakening this power, we can reclaim the wondrous elements that make up our humanity: altruism and cooperation.

Even with individual divisions, a rich and participatory culture enables a progressive civic life to flourish.

If we're caught between the market and the state, we can build an economy that respects both people and the planet.

We can create such an economy around a large neglected domain, and that domain is the commons.

The commons is neither a market, nor a state, nor capitalism, nor communism. The commons is made up of three things: a specific resource, a specific community that manages that resource, and the rules and negotiations that the community creates to manage that resource.

Think about community broadband connectivity, shared energy, common land for growing fruits and vegetables.

It's common land that isn't sold or given away, and any profits that arise are shared equally among all members of the community.

We can restore our own politics in places that have been neglected and exploited.

We can wrest democracy out of the hands of our oppressors.

We can use new rules and methods of elections to ensure that the power of money never again trumps the power of democracy.

(Applause) We need to modify representative democracy with participatory democracy so that we can hone our political choices, and those choices should be carried out at the local level wherever possible.

What can be decided locally should not be decided on a national scale.

I collectively call these the politics of belonging.

I think this idea has the potential to appeal to a wide range of people, because one of the very few values ​​shared by both the left and the right is about belonging and community.

The words may have slightly different meanings, but let's start with the common language.

In fact, politics can be viewed in many ways as a process of seeking belonging.

Even the fascists were looking for a community, but one that was terrifyingly homogenous, where everyone looked the same, wore the same uniform, and chanted the same slogans.

What we need is a networked community that builds bridges rather than binds them together.

Bonding networks bring people together within homogeneous groups, whereas bridging networks connect people between different groups.

I believe that if we can create a sufficiently rich and vibrant community of bridges, we will be able to curb the urge of people to seek shelter and protect themselves from others by fleeing to the security of a bond-bound, homogenous community.

Putting it all together, our new story will look something like this:

The world is suffering from chaos!

(Laughter) These mighty, diabolical forces are people who say there's no such thing as community, and that their main purpose in life is to fight like stray dogs over garbage cans.

But the heroes of this story - we will rise up against this chaos.

We will build prosperous, engaging, inclusive, and tolerant communities, and we will fight the nefarious forces, and in doing so, bring harmony back to the world.

(Applause) Whether you feel this is the right story or not, I think you'll agree that we need a new story.

We need new stories of recovery, stories that show us our way out of the turmoil we're in, stories that show us why we're in turmoil and how we can get out of it.

And stories like that, if they're told right, will go beyond political thought and reach into people's minds.

Our job is to tell stories that light the way to a better world.

thank you

(applause)

In the year 415, the city of Alexandria was at war with bishops and governors.

From disagreements over the actions of the armed monks to the branding of the city's most influential figure as a "witch."

Hypatia of Alexandria was a noted mathematician and philosopher who advised city leaders.

In the centuries since her death, the details of her life have been the subject of much controversy and have become almost legendary.

None of Hypatia's writings have survived, but the testimonies of her colleagues and disciples about her work and life tell us about her reputation as a scholar, the temperament that made her a sought-after teacher, and why she was driven to ruin.

Hypatia was born around 335 in Alexandria, then part of the Eastern Roman province of Egypt and a center of learning.

Her father, Theon, was a famous Greek mathematician and astronomer, but her mother is unknown.

Hypatia was probably an only child and was educated by Theon herself.

By the time she reached adulthood, she had surpassed her father in both mathematics and philosophy, becoming the city's preeminent scholar, and succeeding her father as president of the modern-day university of Plato's School of Philosophy.

She improved scientific instruments, wrote math textbooks, and developed efficient ways of doing long arithmetic.

But perhaps the most notable achievement of her academic life at Alexandria was her teaching.

The philosophies Hypatia taught inherited those of the great Plato, Aristotle, the mystical philosopher Plotinus, and the mathematician Pythagoras.

Their philosophical influences interacted and merged to give birth to the school of Neoplatonism.

For Neoplatonists, mathematics had a spiritual dimension and was considered to be divided into four areas: arithmetic, geometry, and astronomy and music.

These subjects were studied not simply for curiosity or for practical application, but because they believed numbers were the sacred language of the universe.

Neoplatonists believed there were rational cosmic forces at work in the repeating patterns of algebraic formulas, the geometrical shapes, the orbits of celestial bodies, and the evenly spaced, harmonious tones of music.

Students immersed themselves in the study of the world of order and mathematics, seeking to identify with the One, a higher dimensional force. Hypatia was believed to be a pagan, a pre-Christian Roman tradition, not worshiping any particular god or deities, and was able to apply her ideas from a variety of religious perspectives.

Judeo-Christian and pagan students flocked from all over the empire to learn from her.

Hypatia's non-partisan environment was welcoming to all students, especially given the religious and political turmoil in Alexandria at the time.

At that time, Christianity had just become the religion of the empire.

The local archbishop, Cyril, is expanding his political power, ordering armed, fanatical Christian monks to destroy pagan temples and harass Jews.

And he turned to the secular authority of the Roman governor, Orestes, who was himself a moderate Christian, but the feud between the two became public.

Hypatia was known to be wise and just, so when Governor Orestes consulted Hypatia, she was advised to "act fairly and calmly."

But when the monks of Cyril rioted, Orestes, who was badly wounded, tortured and executed the leader.

Cyril and his followers accused Orestes of disobeying Christianity by the magic of Hypatia.

In March 415, Hypatia was driving her carriage through the city when the bishop's monks dragged her out of the carriage, slaughtered her, and cut her to pieces.

Hypatia's death marked a turning point in Alexandria's politics.

Her murder led to the exile of other philosophers of the Greek and Roman traditions, and the decline of the city that once served as a center of learning.

In a very real way, her research, her openness and her spirit of equality were buried with her.

Just a mile away from here, in Old Town Edinburgh, is Panmuir House.

Panmuir House was home to the world-famous Scottish economist Adam Smith.

In "The Wealth of Nations," his most important work, and on many subjects, Smith argued that a nation's wealth is not measured solely by its stockpile of gold and silver.

A nation's production and trade totals serve as indicators

This is perhaps one of the earliest examples of what is now known as GDP (gross domestic product).

And then time went by, and that measure of production and trade, or GDP, became more important than ever, until -- until, I don't think Adam Smith intended it -- it was often considered the most important measure of a nation's overall success.

What I want to argue today is that now is the time for that to change.

How we measure our prosperity as a nation is an important choice.

It's really important, because it drives the political focus and drives public action.

But in that context, I think the limits of GDP as a measure of national prosperity are too obvious.

GDP measures the total product produced by labor, but it says nothing about the nature of each labor.

For example, GDP includes figures for illicit drug consumption, but not unpaid care.

GDP values ​​economic activity in the short term that fuels the economy, even if it costs the sustainability of our planet in the long run irreparably.

Looking back over the past decade, political and economic turmoil has continued, and inequality has widened. But ahead are the challenges of perilous climate change, increased automation, and an aging population.

To that end, in 2018, Scotland took the lead in creating a new network, a group called the Wellbeing Economy, which was founded by Scotland, Iceland and New Zealand.

You know why these three nations are called SIN, but of course our purpose is the public good.

The purpose of this group is to challenge the fixation on the narrow measure of GDP.

Of course economic growth is necessary, it's important, but there's more to it than that.

GDP growth, at any cost, is not a good target to aim for.

This group argues that the goal and purpose of economic policy should be the well-being of the population as a whole, not just the happiness and health of the population, but the wealth of the population.

I'll talk about the policy implications of this idea later.

Especially in the society we live in today, this resonates even more deeply.

When we focus on wellbeing, we create conversations that spark deep insights and fundamental questions.

What is really important in our lives?

What values ​​do we hold in our community?

What kind of country or society do we really want?

If we encourage people to participate and think in order to find answers to questions like these, I believe we can find solutions to the same political alienation and frustration faced by so many developed countries around the world.

Policy-wise, the journey began in Scotland in 2007 with the launch of a set of indicators for self-assessment called the National Performance Framework.

They're indicators of income inequality, child well-being, access to green space, access to housing, and so much more.

None of those things are reflected in GDP statistics, but they're all the foundation of a healthy, happy society.

(Applause) And this broader approach is the cornerstone of our economic strategy, where we place as much weight on reducing inequality as we do on economic competitiveness.

And it promotes the policy goal of decent working conditions -- good jobs and good pay.

And we created the Just Transition Commission to lead the journey to a zero carbon economy.

As the history of economic innovation has taught us, if we're not careful, there will be more losers than winners.

Faced with the challenges of climate change and automation, we must never make the same mistake twice.

The work we do here in Scotland is important, but we have a lot to learn from other countries.

Iceland and New Zealand are partners in the network of wellbeing that I mentioned earlier.

By the way, all three countries have female leaders, but I'll leave it up to you to decide if that matters.

(Applause) Both countries are doing amazing things.

In 2019, New Zealand released its first well-being budget, with mental health at its core. Iceland is leading the way in equal pay, child welfare, father's rights, and more. When we talk about building a prosperous economy, we don't immediately look at these policies, but they are the cornerstones of a healthy economy and a happy society.

I started with Adam Smith's Wealth of Nations.

I think equally important is Adam Smith's previous book, The Theory of Moral Sentiments, where he said that the worth of any government should be measured by its realization of the happiness of its people.

I think this is a good basic principle for any national group to promote well-being.

No one has all the answers, neither does Adam Smith's native Scotland.

But in a world of increasing division and inequality, apathy and marginalization, it is more important than ever to think about these questions, seek answers, and promote a society whose vision is centered not just on economic prosperity, but on well-being.

(Applause) You're all here in this beautiful sunny capital --

(Laughter) The country that houses this capital used to lead the world with Enlightenment, into the industrial age, and now it's trying to lead the world into the low-carbon age.

My hope and determination is to help Scotland, in addition to this, change the priorities of nations and governments around the world so that well-being is at the center of everything they do.

I think that's the responsibility of this generation.

I believe that is our responsibility to the next generation and beyond.

If it starts in the birthplace of the Enlightenment, we will build a better, healthier, fairer, happier society here in our homeland.

Then we in Scotland can play our part in creating a more equal and happier world.

thank you very much

(applause)

Recently, the management of an American supermarket chain decided they needed to be more efficient.

So we were enthusiastic about digitizing our operations.

Meat, fresh produce and bakery management departments were abolished and algorithmic allocation of work was introduced.

Instead of working cooperatively together, employees walk in, press the time clock, are assigned a task, and when they're done, they come back to do more.

This is an extreme example of scientific management, where work is standardized and assigned

should be very efficient

But the results aren't very good. Assignment algorithms can't predict when a customer will drop an egg carton, or when a rambunctious child will knock over a product display, or when the local high school will tell all students to bring coconuts the next day.

(Laughter) Efficiency comes in handy when you know exactly what you need.

But when the exception or the unexpected happens, like in the example above, efficiency doesn't help.

The ability to deal with the unpredictable has become a very important issue, because the unexpected is becoming the norm.

That's why experts and forecasters hesitate to predict more than 400 days ahead.

I wonder why?

And that's because over the last 20 or 30 years, much of the world has gone from being complex to being complex and intricate.

It also means that even very small changes can have an extremely large impact.

And expertise doesn't always come in handy, because systems keep changing at an incredible speed.

The rapidity of change means that society is now full of unpredictable events.

So the Bank of England says, "There will be another big crash, but we don't know why or when."

We know that climate change is real, but we don't know where wildfires will occur, and we can't predict which factories will be flooded.

Plastic straws, bags and bottles can go from a necessity to an abomination overnight, catching companies off guard, and changing social norms leaving stars hated and co-workers baffled as outcasts.

In an environment as unpredictable as this, efficiency is not only useless, it undermines and undermines our ability to cope and adapt, especially to situations.

How are we going to face the future when efficiency is no longer the guiding principle?

What ideas would really help?

What kind of talent do you need to protect?

In the past, management methods were advocated of "getting what you need, when you need it," but from now on, I think it's necessary to adopt the concept of "preparing just in case."

The Coalition for Epidemic Preparedness Innovations (CEPI) is one example.

It's certain that infectious diseases will increase in the future, but we don't know when, where, or which diseases will be prevalent.

so i can't plan

but you can prepare

So CEPI develops different vaccines for different diseases, because we can't predict which diseases will occur and which vaccines will work.

Some of these vaccines will remain unused.

Certainly not very efficient

But it's robust, because if you have a lot of options, you don't have to rely on just one technical solution.

The speed at which we deal with an infectious disease depends greatly on the familiarity and trust of the people involved.

But building those relationships takes time, and in times of epidemic, time is always short.

So CEPI is building networks, friendships and alliances now, and we've already factored in the fact that some of these relationships will go untapped.

This is inefficient and probably a waste of time, but it's still robust.

There is also a trend toward robustness in the financial industry.

In the past, bank capital was far less than is required today, and it's the lack of capital and the excessive pursuit of efficiency that has weakened banks.

Increasing equity capital may seem inefficient at first glance, and it is.

But it's also more robust, because it protects the financial system from the worst.

We know very well that countries serious about climate change need to adopt different solutions and different renewable energy sources, not just one.

The most advanced countries have been working to reform their water and food supplies and health care systems for years, because they know that by the time something is reasonably predictable, it's likely too late.

The same approach can be taken in trade wars, and many countries are doing it.

Instead of relying on one big trading partner, we try to have relationships with all of them, because we know that we can't predict which markets will suddenly become volatile.

It takes time and money to get all the deals done, but it's robust because it prepares the whole economy for a crisis.

This is a strategy especially for small countries, where they know that they don't have the economic power to give them an edge, so it's better to have more friends.

On the other hand, if we're stuck in an organization that's still trapped in the "efficiency myth," how do we make a difference?

Experiment

In the Netherlands, home-visit care used to be run like a supermarket, where tasks were standardized and ordered by the minute, nine minutes on Mondays, seven minutes on Wednesdays, eight minutes on Fridays, and so on.

All the nurses hated it

So one of the nurses, Jos de Block, proposed an experiment.

Every client is different and we can't know exactly what they need, so why not let the nurse decide?

Reckless?

(Laughter) (Applause) Through Jos's experiment, we've found that people's health improved in half the time, and they cut costs by 30 percent.

When I asked Jos what the surprise was when he did the experiment, he kind of laughed and said, "I never thought it would be possible to make such a big improvement so easily, because it was so unpredictable, no matter how much I sat at my desk or stared at my computer screen."

Today, this type of caregiving is spreading rapidly across Holland and around the world.

But when I change countries, I start with trial and error again, because everywhere there are subtle and unpredictable differences.

Of course, not all experiments are successful.

Jos tried a similar approach with the fire department, but found it to be unsuccessful because it was a centralized organization.

A failed experiment can seem inefficient, but failure is often the only way to understand how the real world works.

Yeosu is now testing this method with teachers.

Experiments like this require creativity and a great deal of courage.

In England -- I almost said England. In England -- (Laughter) (Applause) One of the best rugby teams in England is the Saracens.

Managers and coaches realized that the strength training and data-driven conditioning practices of this team had become mediocre, because every team was doing exactly the same thing.

So I took the risk and tried an experiment.

Even during the season, we took the whole team on ski trips and visits to Chicago's social services.

It was certainly an expensive and time-consuming undertaking, and it might have been a little risky to send a large army of rugby players to the slopes.

(Laughter) But what the managers noticed was that the players had renewed their bonds of loyalty and solidarity.

And as players take to the pitch under intense pressure, they become, in the words of their manager, "calm," a sign of firm and unwavering devotion between players.

The opposing team is a little intimidated by that, but they're too obsessed with efficiency to try it.

At a London tech company called Verve, the CEO gathered all sorts of data, but couldn't find anything that could impact productivity.

So we started an experiment called "Love Week," where for a week, each employee would find something witty, useful, or imaginative in their partner's behavior for the week and praise it.

This takes a lot of time and effort, and many would say it's distracting.

But it revitalizes the company and increases the productivity of the company as a whole.

Preparedness, solidarity, imagination, experimentation, courage, these are the sources of resilience and strength in unpredictable times.

It may be inefficient, but it gives us an infinite capacity to adapt, change and invent.

The more we don't know the future, the more we need human, chaotic, unpredictable skills.

On the other hand, our growing reliance on technology is like giving up those skills.

When we use technology to force us to make decisions and choices, to try to read people's minds, to guide conversations, we put in the hands of machines what we could do ourselves, and the cost is high.

Instead of thinking for yourself, you try to make a machine think for you, the less you think for yourself.

And -- (Applause) The more time doctors spend staring at electronic medical records, the less time they spend with patients.

The more parenting apps you use, the less you know about your child.

The more time you spend with people you predict and choose to like, the less likely you are to connect with people who are different from you.

As we no longer need to care, compassion fades away.

All of these technologies attempt to force a world of infinite surprises into a standardized model of predictable reality.

What do you miss there?

Anything that cannot be measured—anything that has value

(Applause) As we become more dependent on technology, we become less skilled and more vulnerable to living in an increasingly complex real world.

In the past, in the process of thinking about the extreme stress and turmoil that we're all going to face one day, I've spoken to many executives who have had their own companies in existential jeopardy and were on the brink of bankruptcy.

It was frank and heartbreaking.

There were many people who shed tears just by remembering

And he asked, "How did you get over it?"

And everyone gave the same answer

“Not data or technology

Thanks to my friends and colleagues, I have been able to do my best.”

Some said, "It's the antithesis of the gig economy, which is all about one-off jobs."

On the other hand, I went to a group of young, high-spirited corporate executives and asked them, "Who are your friends at work?"

Then he makes a blank expression

"no time"

"too busy"

"Not efficient"

I wondered, who gives them imagination, stamina, and courage when they're in trouble?

Anyone who says they know the future is just trying to get it -- a fake destiny.

The harsher and deeper truth is that the future is uncharted territory and you can't map it until you get there.

But it's okay, we have a rich imagination, just use it.

We have a wealth of talent for thinking and exploring, and we have to use it.

We have the courage to invent things we've never seen before

If you lose those skills, you lose sight of where you're going.

But by honing and developing our skills, we can create any future.

thank you

(applause)

In Japan, I leave my apartment every other night and walk 15 minutes uphill to my local health club, where there are three ping-pong tables in one room.

Because the space is limited, every platform has a pair practicing the forehand and a pair practicing the backhand, and every now and then the ball hits you in the air and everyone goes, "Wow!"

Then we divide into groups, choose partners, and play doubles.

But honestly, I don't know who won, because they change partners every five minutes.

Everyone is desperate to score, but no one is scoring the game.

After an hour or so of intense fighting, not knowing who won feels like the ultimate victory.

Japanese people are said to have developed a competitive spirit without competition.

As we all know, the best way to learn about geopolitics is to watch table tennis.

(Laughter) The two most powerful powers in the world were formidable rivals until 1972, when the American table tennis team was allowed to visit communist China.

As the former foes gathered around the little green ping-pong table, each could declare victory, and the world could breathe a little easier.

China's Chairman Mao Zedong created a table tennis guidebook, calling the sport a "spiritual nuclear weapon."

The only lifetime honorary member of the American Table Tennis Association is President Richard Nixon, who helped create this win-win relationship through ping-pong diplomacy through table tennis.

But long before that, the history of the modern world was best told through a bouncing white ball.

"Ping-pong" sounds like "sing-song," and sounds somewhat oriental, but it's actually thought to have originated in Victorian England's upper classes, where they banged wine corks across a wall of books after dinner.

(Laughter) I didn't adapt.

(Laughter) By the end of World War I, the sport was dominated by Austro-Hungarian athletes, and eight of the first nine world championships were won by Hungarian athletes.

And the people of Eastern Europe were so good at hitting back anything they hit that the game became a stalemate.

In one match at the 1936 World Championships in Prague, it took two hours and 12 minutes for the first goal to be scored.

For the first point!

Longer than a 'Mad Max' movie

According to one of the players, the referee had to leave the game with a sore neck before the point was even scored.

(Laughter) The player started playing chess while switching rackets to his left hand and even hitting back.

(Laughter) Of course, many of the people in the audience started to leave, because we had 12,000 clashes before we scored that one point.

The International Table Tennis Federation was forced to call an emergency meeting on the spot, and the rules were quickly changed to 20 minutes per game.

(Laughter) Sixteen years later, here's Japan: Hiroji Sato, a then-unknown watchmaker, competed in the 1952 World Table Tennis Championships in Bombay.

Sato was small, had no outstanding results, and wore glasses, but unlike the other players, he used a racket with thick sponge rubber instead of a lumpy rubber.

And thanks to this secret weapon of sound deadening, the unnamed Sato won the gold medal.

When he returned home, a million people took to the streets of Tokyo to celebrate his triumphant return, and Japan's post-war recovery truly began.

What I learned through my regular matches in Japan was the sport of world domination in my mind -- about life.

We don't play singles at our club, only doubles, and we change partners every five minutes, so often when we lose, six minutes later we're winning.

Also, since it is a two-set match, there are often no losers in the first place.

"ping-pong diplomacy"

Growing up in England, I was taught that the point of a game is to win.

But Japan taught me that it's important to make as many people as possible feel like a winner.

Here, there is no ups and downs alone, we are part of a stable choir.

Our club's best players use their skill to take a game that's won 9-1 and turn it into a 9-9 game in which everyone takes serious action.

A friend who often throws high lobs that short opponents stumble and miss, scores a lot but is still considered a loser by everyone.

Japanese table tennis is like loving

They're learning how to play together rather than fighting each other.

And to be honest, at first, I felt like the game was totally boring this way.

You can't celebrate with a big come-from-behind win against your strongest opponent, because six minutes later you're teaming up with another partner and losing again.

On the one hand, I was never disappointed.

When I left Japan and started playing singles against my British nemesis again, I found myself deeply disappointed every time I lost.

But even when I win, I don't sleep well, because I knew it was all downhill.

If I had tried to do business in Japan, I would have been in endless frustration.

What's unique about Japan is that if the game remains tied four hours into the game, baseball ends in a draw, and because league records are based on winning percentage, teams with more draws can outperform teams with more wins.

The first American to coach a professional baseball team in Japan was Bobby Valentine in 1995, who was quickly fired after leading a truly unremarkable team to an astounding runner-up finish.

Why?

"It's-" said the club spokesperson, "because he was obsessed with winning."

(Laughter) On the surface, Japan feels like that one-goal game that took two hours and 12 minutes, and playing hard to beat can take away all your imagination, your audacity, your excitement.

On the other hand, playing table tennis in Japan reminds me of why a choir is more fun than singing solo.

In a choir, when you perfect your little part, put your heart into your sound, and create beautiful harmonies working together, you can do something much better than the sum of your parts.

Of course, choirs need conductors, but I think choirs free us from this childish simplistic sense of "one in two."

Realize that the opposite of winning is not losing, but not seeing the big picture.

It really amazes me that in life, nothing can be properly evaluated until much later.

I once lost everything I had in a wildfire.

But it was this seeming loss that eventually led me to live a gentler life on earth, to writing without notes, to moving to Japan, to the mental health club of the ping-pong table.

On the contrary, I've found that what seemed like happiness when I had the perfect job before can get in the way of true joy more than misery.

When I play doubles in Japan, I am freed from all worries, and at the end of the night everyone goes home feeling more or less as happy.

Every night I am reminded that not being overtaken is not the same as falling behind Just as not being cheerful is not the same as being dead

And it made sense to me, why in Chinese universities you can get degrees in table tennis, and why studies have shown that playing table tennis can alleviate mild mental illnesses, even autism.

In 2020, as I watch the Tokyo Olympics, I'm sure you're very aware that you won't be able to tell for a long time who's the winner and who's the loser.

Remember that score we talked about earlier that took 2 hours and 12 minutes?

Six years later, one of the players was imprisoned in the Auschwitz and Dachau concentration camps.

was able to come out alive

I wonder why?

That's because the guards at the gas chamber recognized him as a table tennis player.

Was he the winner of a match that will go down in history?

it doesn't matter

Many people left the venue before the first point was scored.

What saved his life was the fact that he was just participating.

Every other night Japan tells us that the best way to win any game is to never worry about scoring.

thank you

(applause)

think about where you sit

If we rewind time, it could have been submerged at the bottom of shallow water, buried beneath rocks miles thick, or drifting through a hellish landscape melted by the heat.

But if you go back about 4.6 billion years ago, you'll find yourself in the middle of a giant cloud of dust and gas orbiting a newborn star.

This is one of the biggest and smallest mysteries of physics, the mystery of the "cotton dust" of cosmic dust.

The seemingly empty space between stars actually often contains clouds of gas and dust blown away by supernovae.

When a dense cloud reaches a certain threshold of Jeans mass, it collapses on its own.

As the cloud shrinks, it spins faster and faster and heats up until it's hot enough to burn the hydrogen at its core.

Stars are born at this point

When nuclear fusion begins in a new star, it ejects gas above and below the cloud, leaving behind an orbiting ring of gas and protoplanetary disk.

We have incredibly strong winds here, swirls of gas that scatter particles and cause them to collide with each other.

Dust is made up of tiny pieces of metal, rock grains and, oddly enough, ice.

We've seen thousands of these discs in the night sky, and they're in various stages of development -- as they're turning into larger and larger clumps of dust.

Dust particles are one-hundredth the thickness of a human hair and stick to each other by van der Waals forces.

At this point, the electron cloud moves to one side of the molecule, becoming negatively charged on one side and positively charged on the other side.

Dissimilar charges attract each other, but van der Waals forces only allow small ones to bond.

This is where we run into a problem: once the dust clumps reach a certain size, the windy environment of the disk should cause the clumps to break when they collide with each other.

The first mystery of "cotton dust" is why it keeps growing.

To answer this, one theory looks at static electricity.

Intense gamma-ray, x-ray and ultraviolet photons eject electrons from gas atoms in the disk, creating positive ions and negatively charged electrons.

The electrons collide with the dust and stick to it, charging it negatively.

And when the wind pushes the mass out, like charges repel each other, slowing them down as they collide.

A gentle collision won't break it apart, but too much repulsion won't make it bigger.

One theory is that high-energy particles can knock more electrons out of the dust clump, making the dust clump positively charged.

Dissimilar charges also attract each other, and the clump grows rapidly.

But soon another mystery will emerge.

Evidence from meteorites tells us that these fluffy "fluffs" eventually heat up, melt, and then cool down into solid granules called chondrules.

It's unclear how and why it happens

Besides, once those granules are formed, how do they attach to each other?

The electrostatic forces that have existed before are too weak, and small rocks can't be held together by gravity.

Gravity increases in proportion to the mass of the object involved.

So even if it's an asteroid the size of a small mountain, you can easily escape with just the power of your legs.

So if it's not gravity, what is it?

probably dust

A fluffy dust rim that collects on the outside of the granules may act like Velcro.

Evidence for this is found in meteorites, where many chondrules have their rims covered with very fine material, possibly clumped dust.

Eventually, when the chondrule granules join together within the larger rock and become about a kilometer wide, they are able to hold their shape under the force of gravity.

Collisions and mergers continue to form larger and larger bodies, including the planets as we know them today.

Ultimately, the nascent state of the universe as we know it - the size of the planet, its position in the solar system, and its elemental composition - was determined by an incredible number of chance collisions.

A small change in the dust cloud might not have created the conditions for life to begin on Earth.

One of Pasta Palace's elite chefs has been kidnapped by Burger Bazaar spies to find out the recipe for their secret sauce.

The third party, Sausage Salon, is unaware of the spy, and has sent you to take advantage of this situation.

A top spy, your abilities range from breaking into and conspiracy to cracking safes and telling lies by looking at people's faces.

You tracked a group of kidnappers to where the hostage chef is being held.

From where you're hiding, you can see the chef on the other side of the window, while in front of you is an interrogator wearing headphones speaking into a microphone.

"We already know that the recipe is in the vault on the thirteenth floor of the bank, in safe deposit boxes numbered from 13 to 1300.

Tell me, is that number less than 500? You can't hear the chef's answer, but you know he's lying.

But the interrogator is hooked on it.

And he goes on to ask, "Is that number a perfect square?"

And he asks, "Is that number a perfect cube?" Now the chef answers honestly.

The interrogator thinks for a moment and says, "Okay, tell me if the second digit is 1 or not, and you're done."

He immediately rushed out of the room to tell him that he had the answer and that he would send a spy to retrieve the recipe.

You know the guys at Burger Bazaar have the wrong number.

But can you figure out the correct answer and retrieve the recipe?

Pause the video and think

3 to answer 2 to answer 1 to answer This point is to think backwards

I don't know what the chef said in the last question, and I don't know if he told the truth.

But by the time the interrogator asked this question, you'll find that he'd narrowed it down to two choices, one with a 1 in the second digit and one with a different number.

So our goal is to come up with a two-choice answer to the previous question.

Of these three constraints, the ones that narrow our choices the most are those that are perfect cubes.

This narrows the answer down to eight numbers between 13 and 1300.

So let's say the answer to the third question is true.

Now let's look at the second question.

If the chef answers that this number is a perfect square, then the interrogator's options can be narrowed down to 64 and 729, since these are the only numbers that are both square and cubic.

But neither number has a 1 in the second digit.

So the answer to the second question must have been "no."

So these square numbers can be erased from the interrogator's list, leaving only six more numbers.

Now we can separate this list from the first problem.

If the chef says "yes" to the number under 500, then he has four options, which is too many.

But the no leaves us with two numbers greater than 500, one of which has a 1 in the second digit.

I don't know which number the interrogator thinks is correct.

But never mind, remember that his conclusions were drawn on the basis of lies.

On the one hand, you are in a position to reconstruct the truth.

First, the chef lied about the number being over 500, so it's actually less than 500.

Second, Chef said it wasn't a perfect square, but that's another lie, and it turned out that the actual number was a square.

He finally said honestly that the numbers are cubes.

As we've seen, there are only 64 squares and cubic numbers at the same time under 500.

You discovered the secret recipe and left before anyone else.

Corporate espionage is not an easy ruse, but sometimes it can be a sausage-making secret.

Hercules, one of the strongest in the world, with a brave heart

Orpheus, the enchanter of nature and the master of music

Twin tricksters Castor and Pollux born from an egg

Boreas, sons of the north wind, flying freely in the sky

Long ago, these heroes roamed ancient Greece, leaving legends everywhere they went.

The most legendary of all was when they joined forces for the young Jason.

A few years earlier, Jason's uncle Pelias had mercilessly usurped the throne of Thessaly after the death of Jason's grandfather.

When Jason returned to his father's stolen court, the cowardly king tasked him with a seemingly impossible task: to cross the stormy sea to Colchis and steal the golden pelt of the flying ram from King Aeetes' eyes.

Pelias promised to relinquish the throne if Jason succeeded in obtaining the Golden Fleece.

The gods took pity on Jason's adventurous mission and spread his plea for help, and soon he had a promising crew.

The assembled heroes, along with countless sailors, prophets and defiant demigods, dubbed themselves the "Argonauts," after the name of their sturdy ship.

But their road ahead was filled with abysmal terror that would test even the most belligerent hero.

The first place the group stopped was Lemnos, where the women on the island killed all the men.

As punishment, Aphrodite cursed the island's women to stink, but Jason defied himself and fathered twins with the queen.

The rest of the crew likewise forged new romantic relationships, but were reprimanded by Hercules for their unheroic behavior.

Eventually, they arrived at Bear Mountain, an island where ancient six-armed monsters live with the peace-loving Doriones.

The Doriones welcomed the Argonauts with great joy, but the monsters swarmed down from the mountains and threw rocks at the moored ships.

Hercules fended off the attack all by himself before his shipmates could join the fray.

Energized and triumphant in their victory, the heroes set out on their journey, but after many nights of storms, their ships were blown back to the same island.

During a great storm, the Doriones thought their new arrivals were invaders.

The Argonauts, too, were oblivious to their surroundings, fighting in confusion in the dark, killing waves of enemies.

But the morning light revealed the grim truth: these victims were none other than those who had hosted them before.

Once again, Jason failed to get his crew together, and this time, he paid a heavy price.

Ashamed of his leadership, Jason decided to focus on obtaining the Golden Fleece, but even this impatience had catastrophic consequences.

When Hercules' squire was kidnapped by a water nymph, Jason sailed on, unaware of the absence of his most powerful crew.

The remaining Argonauts continued their journey until they stopped when they saw an old man surrounded by a flock of harpies.

The old man was Phineas the prophet, and was cursed by Zeus with old age, blindness, and endless tortures for prophesying.

Moved by his behavior, the Brothers of the Wind attacked the harpies, giving Phineas a chance to rest from his punishment.

In return, the Prophet told the group how to pass the dreadful challenge ahead—the twin rocks known as the Shumplegades, which would smash into ships and shred them to pieces.

But first, the Argonauts must sail past the gates of Hell, under hallucinogenic skies, and around the bloodthirsty island of the Amazons.

Some feared that such an adventure might drive them insane, demoralized and disempowered.

When they reached the clashing rocks, the exhausted party trembled with fear.

But Phineas' advice flashed vividly in my mind.

The Argonauts released a dove and ran after it, and escaped unscathed.

Colchis finally appeared in the eyes of the Argonauts who had saved their lives.

But even as Jason rested and celebrated with his comrades, he sensed that his time with the company was drawing to a close.

The golden fleece flashed in his mind and he knew he had to get it alone

Unbeknownst to him at the time, the price he would pay for this final mission would be the highest he'd ever paid for his journey.

Billions of years ago, on a young earth, simple organic compounds were made into complex composite materials that could grow and reproduce.

They were the first life on Earth, and have since spawned billions of species on this planet.

At that time, the Earth was not, as far as we know, suitable for life.

The young Earth had widespread volcanic activity and a bad atmosphere.

So where on Earth did life begin?

To start looking for places to nurture life, you need to understand the basic things that make up life.

The elements and compounds necessary for life are hydrogen, methane, nitrogen, carbon dioxide, phosphoric acid and ammonia.

For these substances to mix and react, they need a liquid solvent, water.

And all life needs an energy source to grow and reproduce.

Life can be divided into two groups: autotrophs, like plants, which produce their own energy, and heterotrophs, like animals, which get their energy from other organic matter.

The first life, of course, could not ingest other organic matter, so autotrophs must have derived their energy from sunlight or chemical concentration gradients.

So where were the places that met these conditions?

Closer to the surface of the earth or the sea is better for harnessing sunlight.

But when life first appeared, UV radiation on the surface of the Earth was probably too harsh for life to survive.

There is only one place where other sources of energy exist that are protected from this UV light, and that is hydrothermal vents on the ocean floor, which are covered by seawater miles deep and complete darkness.

Hydrothermal vents are fissures in the earth's crust where seawater seeps into magma chambers and erupts at high temperatures along with suspensions rich in minerals and simple compounds.

Energy is condensed in hydrothermal vents, where the chemical concentration gradient is particularly steep.

There's another piece of evidence that supports the hydrothermal vent hypothesis: the last common ancestor, or LUCA for short.

LUCA isn't the first life on Earth, it's the oldest life we ​​can trace.

But we don't really know what LUCA looks like. There are no LUCA fossils or LUCAs that have survived to the present day. Instead, scientists have identified genes that are common to species across three domains of living organisms: bacteria, eukaryotes, and archaea.

Because these genes are common across species and domains, they must come from a common ancestor.

These common genes indicate that LUCA lived in hot, oxygen-free places and harvested energy from places with high chemical concentration gradients, such as hydrothermal vents.

There are two types of hydrothermal vents: black smokers and white smokers.

Black smokers emit carbon dioxide-rich water—heated to hundreds of degrees Celsius—acid water rich in sulfur, iron, copper, and other metals vital to life.

But now scientists think black smokers are too hot for LUCA, and white smokers are the likely candidates for life.

Among White Smokers, the area where there is a hydrothermal vent called "Lost City" on the Mid-Atlantic Ridge is listed as the most likely candidate for the place where life is believed to have originated.

The seawater that erupts from here is highly alkaline, lacks carbon dioxide, but is rich in methane, and at a temperature more favorable to life.

Neighboring black smokers contributed to the supply of the carbon dioxide needed for the evolution of life in the Lost City, creating all the elements to support the first life forms, and expanding the astonishing diversity of life on Earth today.

Hi, I'm Dessa and I'm a member of a hip-hop collective called Doomtree.

I'm wearing a tank top

(Laughter) I'm a rapper and a singer, and I perform everywhere.

Here's how the group performed

I'm the one wearing the boots

Jumping up and down a lot, sweating a lot

very lively and full of energy

Sometimes I bump into other members unexpectedly

Sometimes I intentionally bump into things and get in the way

It's like playing hockey with friends and adding a live performance.

But as a solo artist, when I sing my own songs, I tend to sing more melancholic songs.

A few years ago, when I played a few songs from the demo version of the new album to my mother, she said, "It's a nice song, but why are they all so sad?"

(Laughs) "Only songs that make you want to vomit blood."

I thought, "Where on earth did you learn to say that?"

(Laughter) So far in my career, I've written a lot of heartbreaking love songs, so I got a message from a fan who said, "Get a new song or a book! I want to recover from a broken heart."

(Laughter) I've been singing, recording, and touring all these songs for so long that I've found that "pain of love" has become my favorite category.

The only thing I didn't tell you was that most of the songs were about the same person.

Our efforts to keep the relationship going lasted for about two years, which extended to five years, and it's been 10 years with no separation.

Not only was my heart broken, I was embarrassed by my inability to get over it, while others seemed to get over it when the time was right.

Even though I knew that being together wouldn't be good for us, we were at a loss as to what to do with this love.

One evening, over a glass of white wine, I watched a TED talk by a woman named Dr. Helen Fisher, who said that her research had identified the coordinates of the romantic parts of the human brain.

So I thought if I could pinpoint where love was in my brain, maybe I could get rid of it.

It's time for Twitter

"Isn't fMRI available in the middle of the night?

I have a favor to ask of you with the dressing room pass and whiskey."

(Laughter) This is Dr. Cheryl Olmann, working at the Center for Nuclear Magnetic Resonance Research at the University of Minnesota.

she accepted

I explained Dr. Fischer's protocol, and the number of samples was one, so I tried to replicate it.

(Laughter) So I put on a dark green hospital gown, lay down on a bed, and was sent into an fMRI machine.

For those of you who don't know, an fMRI machine uses a giant cylindrical magnet to track the dynamics of deoxygenated hemoglobin in the blood.

So at a given moment, it reveals which part of the brain needs the most oxygen.

You can see which neural activity is relevant to a given task. For example, when I move my finger, the same areas always signal. In my case, I look at a picture of my ex-boyfriend, and then I look at a picture of another man, who looks a bit like him, but doesn't feel anything in particular.

Contrast

(Laughter) When I came out of the device, I had a super-high-resolution image of my brain.

You can also separate the right brain from the left brain.

If you stretch out the folds in the cortex, you can also see inside the folds.

(Laughter) You can see how my brain reacted to a picture of two men.

this is where it matters

You can track all the activity in your brain when you're shown the contrast and when you're shown your ex-boyfriend, and by comparing these data, you can extract only "love." It's like putting clothes on the scale, then undressing and stepping on the scale, and the difference in measurements tells you the weight of the clothes.

When you compare the data and subtract one from the other, you see activity in the region that Dr. Fisher would have predicted.

this is me

this is my brain in love

We saw activity in the ventral tegmental area, indicated by the small orange dots, the red spiral anterior cingulate, and the golden horn-like caudate nucleus.

After spending time with the research team and partners Andrea and Phil analyzing the data, Cheryl sent me an image.

It was a cross-section of my brain, with one bright, active dot representing my feelings for my ex.

I knew you were in love, and that's why I put so much effort into it.

And when I had the images to prove it, I felt like I had an endorsement.

(Laughter) I also felt like a hitman who had found his target.

That's the one to kill

So I decided to undergo a treatment called neurofeedback.

When I asked a woman named PennyJean Gracefire to do the procedure, the first thing I was told was that this was brain training.

I don't remove the brain

By training your brain like you train your muscles, your brain gains flexibility and resilience to respond appropriately to situations.

Your heart beats faster on a treadmill, and your heart muscle moves more slowly when you're asleep.

Similarly, when you're in a long-lasting, loving relationship, the emotional part of your brain should be active, and when you're not in a long-lasting, loving relationship, it should be relaxing.

She brought along a set of electrodes a little smaller than a coin that were sensitive enough to measure brain waves through bones and hair and scalp.

When I put it on, I could see the brain activity on the spot.

When I was shown a different display, I was able to see which parts of the brain were overactive. The red part was. The blue part was the low activity.

We could also show just the parts that show romantic activity, which Dr. Fischer's research revealed.

Penny Jean put the electrodes on me several times and explained that I didn't have to do anything or think about anything.

I just don't move, I just stay awake and watch

(harp and vibraphone sounds) I did as I was told.

Harp and vibraphone music played when my brain returned to normal activity.

I was watching my dad's TV show my brain spinning as slowly as a grilled meat spins.

It was a counterintuitive action

I was told that learning happens unconsciously.

So I thought about other things that I could have learned without consciously thinking about it.

I don't think about the movement of my left calf when I ride my bike, and I don't know how my latissimus dorsi strains when I lean to the right.

my body remembers

In the same way, Pavlov's dogs probably don't know the structure of proteins or the waveforms of bells they hear, but their bodies associate stimuli with them, and they salivate.

After a few sessions, I revisited Dr. Sherrill Olman's fMRI machine and repeated the same process, using the same photos of his ex and the controls. To ensure scientific rigor, Sherrill and the team didn't know which was which, so the results wouldn't be affected.

Cheryl sent me the image after analyzing the data from the second measurement.

According to her, "Man A's brain occupation appears to have been removed.

Isn't that the desired result?"

(Laughter) It was exactly the desired result.

So for the first time, I looked back and wondered how I was feeling. and

In a way, the element of the initial feeling remained intact.

It's not "Eternal Sunshine"

My ex-boyfriend isn't someone else

I had a complex web of emotions built up over a long period of time: love, jealousy, affection, attraction, respect.

But the positive feelings came to the surface, and not many of the less tolerant feelings, like obsession, were left.

In some ways, it might be a small thing, I just sorted out my feelings -- but it was a big deal for me.

For example, when you say, "I'm going to give you anesthesia now, and then I'm going to pull out your wisdom teeth," the order in which you do the treatments matters, doesn't it?

(Laughter) And then I thought, maybe I've had a very rare philosophical gift for understanding love.

The lab 3D printed my caudate nucleus.

I actually got love

(Laughter) I'm making it out of metal, turning it into a necklace, and I'm selling merch at my gigs.

(Laughter) (Applause) With the help of some friends in Minneapolis, one of whom is Becky, I also built a giant disco ball.

I think it gave me an opportunity to understand more about romantic feelings, and I also understood the impulsive part of love.

Love is not a pretty symmetrical heart shape

It's a full-body thing, and it's shaped like a ram's antlers hidden in the back of your head. When someone special comes near, it flashes, and if they like you and you're both happy, they light up the flames.

If not, get a group of neuroscientists and force them to smother it.

(laughs) Thank you.

(applause)

I was born in 1993 in the north of North Korea, in a town called Hyesan, on the border with China.

I had loving parents and a sister

Before I was even 10, my father was sent to a labor camp for smuggling.

Yes, by that "smuggling" my father was selling clogs, sugar, rice and later copper to support his family.

In 2007, my sister and I decided to run away.

my sister was 16 and i was 13

I need you to understand what the word "fleeing" means in North Korea.

We were all starving.In North Korea, hunger means death.

So escape was our only option.

I didn't even understand the concept of escape, but at night I could see the lights of China, and I thought that if I went to that place with the lights, I might find a bowl of rice.

It's not like there was a grand plan or a map.

I had no idea what was about to happen

Suppose your apartment catches fire.

what would you do?

Would you bet on staying there and burning to death, or jumping out the window?

we chose the latter

I ran out of the house, not out of the fire.

North Korea is an unimaginable country

When people ask me what it's like to live there, it's too difficult for me.

I'll be honest with you.

I don't think you can describe it in any language, because it's a completely different planet, just like you can't imagine life on Mars right now.

For example, the word "love" has only one meaning: love for my dear General.

North Korea has no concept of romantic love.

If you don't know the language, you can't understand the concept, so you don't even realize that the concept is possible.

Let's take another example

When I was in North Korea, I truly believed that the General was an all-powerful God who could see through our thoughts.

In North Korea, I was too scared to even think about it.

I was told that the general was hungry for us and worked tirelessly for us, and my heart was filled with sorrow for him.

When he fled to South Korea, everyone told him that he was really a dictator.

I still remember the first time I saw a picture of him after that and realized that he was the biggest man in the picture.

(Laughter) It was a shock to me.

I finally realized he wasn't starving.

But I never saw it until someone told me he was fat.

(Laughter) I really needed someone to tell me he was fat.

Without the experience of critical thinking, you just see what you're told to see.

The biggest question people ask me is this: "Why isn't there a revolution inside North Korea?

Are people stupid?

Why no revolution against 70 years of tyranny? ”

My answer is, if you don't know you're a slave, you don't know you're isolated, you don't know you're oppressed, how can you fight to be free? and

So if you know you're isolated, that means you're not isolated.

Not knowing is the definition of true isolation, so when I was in North Korea, I never thought of myself as isolated.

I thought I was literally at the center of the world

Listen to my ideas worth spreading. Many people believe that humans are born to know what is right and wrong, what is fair and what is unfair, what they deserve and what they don't.

If you ask me, that's a lie

(Laughter) (Applause) Everything and everything must be taught, including compassion --

If I saw someone dying on the side of the road right now, I would do anything to help them.

But when I was in North Korea, even if I saw a dying person or a dead person on the roadside,

i didn't feel anything

Not because I'm a psychopath, but because I never learned the concept of compassion.

Since I learned the word and concept of "compassion," a feeling of compassion and empathy was born in my heart, and I feel it now.

Now I live in America as a free man.

(Applause) Thank you.

(Applause) And recently, the leader of our free nation, President Trump, met with the God I once worshiped.

And he didn't talk about it, saying it wasn't important to include human rights on the agenda.

knowing that made me scared

Right now, we live in a world where a dictator can be honored for putting his uncle to death, killing his half-brother, and killing millions of North Koreans.

that was commendable

So I thought, maybe now we all need to be re-educated about freedom.

freedom is fragile

I don't want to make you panic, but it's the truth.

North Korea made George Orwell's 1984 a reality in just three generations.

It took only three generations

If we, as free citizens, do not fight for the human rights of the oppressed and voiceless right now, who will fight when we lose this freedom?

machine? animal? I do not understand

I think it's great that we care about climate change, animal rights, gender equality, all these things.

The fact that we care about animal rights is that our hearts are so beautiful, that we care about someone who can't speak for themselves.

North Koreans can't speak for themselves now.

Even in the 21st century, the Internet will not work.

There's no electricity, and it's currently the darkest place on earth.

Now, I have something to say to my fellow North Koreans living in that darkness.

You may not believe me, but I want to tell them that a new life is possible.

be free

From my experience, literally anything is possible.

I was bought and sold as a slave

But here I am, and that's why I believe in miracles.

One thing I've learned from history is that nothing in this world is permanent.

So we have good reason to hope.

thank you

(applause)

Chris Anderson: Now, I'm going to relay to Caracas to see one of Maestro Abreo's great disciples.

He is the new music director of the Los Angeles Philharmonic Orchestra.

The best young conductor in the world

Gustavo Dudamel!

(Applause) (Music) (Applause) (Gustavo Dudamel) Hi Los Angeles

Hi Quincy, Maestro Zander, Mark

I am so happy to have the opportunity to be with you on the other side of the world.

we can only communicate through music

We are so lucky to have someone like this angel in the world, not just in our country of Venezuela, but for the world.

He gave us the possibility to dream and make it come true.

And the result of that is here, the result of Venezuela's El Sistema.

Maestro, we would like to have an orchestra like this in every country in the world, in every country in the Americas.

And I would like to invite you to listen to a short piece by one of America's most important composers.

Mexican composer Arturo Marquez

"Danson No. 2"

(music) (applause)

For the past three years, I've interviewed some of the worst people on the internet.

If you look around the internet these days, you'll find a lot of harmful garbage: pervasive racist messages, misogyny propaganda, spreading disinformation.

so who made this

I wanted to find out how it spreads.

I wanted to know what effect it had on society.

In 2016, we started tracing these messages to find out who created them and who spread them.

I reached out to them and said, "I'm a reporter, can I go see what you're doing?"

Most of them replied, "Why do I have to talk to you about male hormone-deficient, effeminate, globalist Jew in collusion with the Democratic Party?"

(Laughter) So I say, "That's only 57% correct."

(Laughter) But sometimes I got the opposite answer.

"Okay, come on."

So I ended up visiting a social media misrepresenter in Southern California.

He was a married white man in his late 30s.

In front of him was a table with coffee, a laptop for tweeting, a cell phone for texting, and an iPad for streaming YouTube and Periscope.

That's all

It was with these tools that he was able to sow pernicious fringe issues into the center of the debate in America.

For example, one day when I was there, there was a bombing in New York, and the suspected culprit had a Muslim name.

For the California propagandist, this was an opportunity, because one of his goals was to keep almost all immigrants, especially Muslim immigrants, out of the United States.

So he started a video stream, inciting his followers to tell him that open immigration would kill them all, and asked them to tweet with a specific hashtag so that it would trend.

Many of the hundreds of tweets that are tweeted like this are accompanied by images like this.

This man is George Soros

A Hungarian billionaire, a philanthropist, and to some conspiracy theorists, a globalist mastermind behind the world, one of a handful of elites.

Wait a minute Have you ever heard of something like this? That there's a handful of elites who control the world, and many of them, for some reason, are Jewish billionaires, is one of the clichés used by anti-Semites.

By the way, the New York bomber was an American citizen.

Whatever the circumstances, the immigrants had nothing to do with the incident.

The propagandists in California knew that.

He was knowledgeable and a lawyer

He knew the facts, but he also knew that facts don't move the net.

Emotions move people online

The original expectation of social media was to bring people together and make the world a more open, tolerant and fair place.

Some of them have come true

Social media algorithms aren't designed to distinguish between true and false, good and bad for society, pro-social and anti-social.

Algorithms don't do that

What the algorithm does is measure response, like clicks, comments, shares, retweets.

And if you want your content to respond well, you need to provoke emotions, especially what behavioral scientists call "high-excitability emotions."

Arousal isn't just sexual arousal, but of course it's online, so anything sexual is very effective.

For better or worse, it's something that makes your heart beat

Time and again, I've spent time with false propagandists, and I've seen dozens of people, not just that Californian guy, take advantage of that system. They're not Russian hackers, they're not computer geniuses, they don't have any particular political acumen, but they just know how social media works and are willing to exploit it to their advantage.

At first, I told myself that this was a trivial phenomenon that only happened online.

But now there's no distinction between the internet and the rest of the world.

This ad, which ran on multiple TV stations during the 2018 parliamentary elections, asserted with little or no evidence that a candidate was being paid by the world's blackmailer, Soros.

This is a tweet from the President of the United States, again without evidence, saying that American politics is being manipulated by Soros.

This used to be radical, silly, and neglectable, but now it's become so commonplace that it goes unnoticed.

I spent three years in this world

talked to a lot of people

some of them had no beliefs

They place their bets in a very rational way, and when they just want to make money online or get some attention, they create and spread the most provocative stuff they can.

But there were also people with strong ideas.

Let me tell you, their ideology is not traditional conservatism.

want to take away women's suffrage

People who want to restore segregation.

There were also those who wanted to eradicate democracy itself.

Of course, I wasn't born with that kind of thought.

It's not like I was imbued with that kind of thinking in elementary school.

Many of them were liberals, socialists, other doctrines before they came to the wonderland of the internet.

Why are you doing this?

I can't generalize all cases, but many of the people I spoke to seemed to have high IQs and low EQs.

They seemed more comfortable living anonymously online than in real life relationships.

And they end up withdrawing into places like online message boards, where their morbid tendencies are amplified.

So you say some tacky nonsense, and you get a lot of positive feedback, and you earn pointless points on the site, and you start believing the nonsense yourself.

I spoke to a young woman from New Jersey who, unable to fit in with her new home after high school, suddenly felt isolated and cut off from society, and took refuge in her smartphone.

One website she came across was full of violent and vicious posts.

She found it really offensive, but at the same time, she found it fascinating in a way, and she couldn't take her eyes off it.

She started interacting on the website and felt smarter and more validated.

I started to feel a sense of community, and I began to wonder if there was a grain of truth in those powerful stories.

A few months later, she and her new online friends were driving to Charlottesville, Virginia, to attend a white supremacist demonstration.

In just a few months, she had gone from an Obama supporter to a radical white supremacist.

In her case, she was able to break free from the cult of white supremacy.

many people were not

And just to be clear, I never thought I'd find common ground with everyone I spoke to, and I wouldn't say, "You're a fascist propagandist, and I'm not, but that's fine, so let's hug each other. There will be no differences."

no it's clearly not possible

But I've come to realize that I can't just look away.

We have to understand this situation, because if we don't understand it, we can't protect ourselves.

In the three years I've been in this world, I've received a few harassing phone calls and even occasional threats, but they're nothing compared to what other female journalists get.

Yes, I'm Jewish, but the funny thing is, the neo-Nazis didn't realize I was Jewish, and I'm honestly kind of disappointed.

(Laughter) I'm supposed to be a professional anti-Semite.

Can't you just look at me?

at all?

(Laughter) I didn't hide it.

He writes for "The New Yorker" with the Jewish surname Marantz, and he looks like someone from "Seinfeld," which is set in a co-op.

Still no good?

(Laughter) But aside from that, it's easy with a simple formula: Lonely children + smartphones = 12% neo-Nazis.

the reality is not so simple

When I write articles, I'm better at writing "is" than "should" arguments.

This time it's TED, so let's be hands-on.

What I want to tell you is what netizens like me and all of you can do to make the net a little bit better.

The first is to be a smart skeptic.

I think there are two types of skepticism.

I don't want to bother you with epistemological jargon, but it's called "smart skepticism" and "bad skepticism."

"Intelligent skepticism" is thinking for yourself, questioning every claim and checking the evidence. This is real skepticism.

"Bad skepticism" looks like skepticism, but it's actually a knee-jerk.

When everyone says the earth is round, they say the earth is flat

When people say racism is bad, they say, "Yeah, I doubt it."

So many young white men I've talked to over the years have said things like, "The media and teachers all try to brainwash us, men and whites are privileged, but I don't think so."

I want to be against anything, especially to white teens all over the world, if you say the earth isn't round, or that society isn't male-dominated, or that racism isn't bad, then you're not a skeptic, you're just an asshole.

(Applause) It's important to have agency, and everyone should have it, but let's have wise agency.

About "Freedom of Speech"

Sometimes intellectuals say, "Because of free speech," as if that's the end of the argument, but that's just the premise of any meaningful conversation.

It is only after that that meaningful conversations begin.

So what is "freedom of speech"?

Does that mean that racists and white supremacists should also have Twitter accounts?

Is it okay to harass anyone on the internet in any way?

Just checked this year's list of TED speakers.

No one ever doubted that the earth is round.

Is this a violation of free speech?

We stand for free speech, and that's great, but if you just keep repeating it, it's going to hinder productive discussion.

"Let's make decency cool again"

okay

(Applause) I don't even need to explain.

If I were to do some research on Reddit or YouTube or Facebook and search for something like "Sharia (Islamic) law" or "Holocaust," you might imagine what the search results would look like.

“Is Sharia Law Spreading Across America?”

"Did the Holocaust really happen?"

It's "bad skepticism".

The internet is in a strange situation where biased propaganda is seen as edgy, dangerous and cool, while basic truths and human decency are seen as preachy, hypocrisy and boring.

And social media is designed to fuel it, intentionally or not, because biased propaganda tends to provoke a reaction.

Whether you like the article or not, people click on it and comment on it.

So the number one way to improve is for social networks to change how they work.

(Applause) If you're listening to this story and you're working for, investing in, or owning a social media company, please consider doing so.

We've been trying to maximize people's emotional response, but if maximizing emotional response is having a negative impact on society, then we should change what we're maximizing.

(Applause) But besides putting pressure on social media to improve and keep waiting for them to change, there are things we can do.

It creates and points a better path forward for anxious young people.

If you see something creative and thoughtful on the internet and feel like sharing it with someone, share it, even if it doesn't provoke a high level of emotion.

It's a really small step, but it adds up, because the algorithms on the internet are as powerful as they are reflective of what we do.

Let's just say this and finish

A few years ago, it would have been cool to say, "The Internet is a revolutionary tool that brings us together."

Now it seems cool to say, "The Internet is a giant uncontrollable dumpster fire."

neither expression is correct

The Internet is too vast and complex to call everything good or bad.

The net is dangerous to both the dream of saving the world and the pessimism of destroying the world, because we don't recognize our responsibility.

Nothing is fixed in the future

Humans make the internet

It's human beings who make decisions at SNS companies

It's also humans who decide if a hashtag will go viral.

Humans are the ones who move society forward and backwards.

If we accept that fact, then we should be able to stop waiting for a certain future and act now.

We've all been taught, "The arc of the moral world is long, but it bends in the direction of justice."

well maybe

maybe

but it's just a wish

no guarantee

Arcs don't bend on their own

by some mysterious force it certainly doesn't

To tell you the truth, it feels both frightening and liberating, but it is we who bend ourselves.

thank you

(applause)

The Dnieper is bathed in a gentle sunset, but the atmosphere is tense among the Zaporozhye Cossacks.

The year was 1676, and the Peace of Zurafno officially ended the war between the Polish-Lithuanian Commonwealth and the Ottoman Empire.

But when Stephan and his men returned to the fort, the word peace was not on their minds.

Home to the "wilderness" north of the Black Sea, the Cossacks -- whose name derives from the Turkic word for "free man" -- were known to be one of Europe's most formidable fighting groups.

Cossacks of hunters, fishermen, nomads and ruffians found their freedom in fertile lands that belonged to no one.

But this freedom became increasingly difficult to maintain.

After decades of changing allies between Poland and Russia, their lands were divided.

In a desperate attempt to reunite the divided Cossack lands and restore independence, the new leader, Chief of State Petrov Doroshenko, chose to ally with the Ottoman Empire.

This alliance liberated the Zaporozhye Cossacks in the west from Polish rule, but the victory was bitter.

The Ottoman forces, allied with Doroshenko, plundered the countryside and took the peasants as slaves.

And his alliance with Muslims against fellow Christians provoked outrage, and he lost all the little local support he had.

Now that Doroshenko has lost his position as chief and is in exile, the Cossacks are fighting over the next move.

Until then, Stephan must maintain order.

Armed with a musket and a curved saber, he is imposing,

Oversee the battalion of 180 men under your command.

Most of them are members of the Eastern Orthodox Church and speak a Slavic language, the prototype of modern Ukrainian.

But there are also Greeks, Tatars, even Kalmyks of Mongolian descent, who have different opinions about recent events.

Stepan's men ostensibly swear to uphold Cossack law, undergo seven years of military training, and remain single for the rest of their lives.

But in reality, there are part-time Cossacks who maintain their traditional way of life while supporting their families in neighboring villages outside Cossack lands.

Fortunately, this fuzzy peace was not broken as they made their way to Sich, the center of Cossack military life.

At that time, Sici was located in Chortomrık, but depending on the situation of the military campaign, Sici changed its location.

The settlement was surprisingly well-organized, with government offices, officers' quarters, and even a school.

Stepan and his men make their way to the barracks, where they live and train.

In the barracks, the Cossacks wash down dried fish, sheep's cheese and salted pork fat with copious amounts of wine.

To lighten the mood, Stepan has his friend Yuri play the bandura.

But then we started arguing

One of my men made a toast to Doroshenko.

Stephan stops the toast

As the room fell silent, Stepan toasted Ivan Sirkoh, the new head of state, who wants an alliance with Russia and a counter to Turkey.

Stephan intends to stand by him, and expects his men to do the same.

Suddenly, Sirco's men rushed in, announcing an urgent "radha," or plenary session.

Stepan and his men make their way to the square in front of the church, the center of life in Sicily.

Ivan Sirko brings good news to the bewildered mob that scouts have spotted a large Ottoman army, one side of which is completely defenseless.

Tomorrow, Sirko vowed to march against their common enemy, defend Cossack autonomy, and unite the Wilderness.

As the Cossacks cheered in unison, Stepan was relieved that the bonds of brotherhood had been restored.

Over the next 200 years, these freedom fighters would face many enemies.

And tragically, they end up being the very tyrannical agents of the Russian government that they initially resisted.

But when it comes to 17th-century Cossacks, they are known for their independence and rebellious spirit.

As the Russian painter Ilya Repin once said, "No one in the world has ever valued freedom and equality and brotherhood as much as they do."

As a society, we need to collectively make decisions that will shape our future.

We know that group decisions don't always work.

can have really bad consequences

How do groups make good decisions?

Research shows that groups are smarter when each individual thinks independently.

And so peer pressure, media, social media, or even just conversation can influence how people think and undermine collective intelligence.

On the other hand, by talking, groups exchange knowledge, correct and improve each other, and also generate new ideas.

I know that

So, does talking to each other help or hinder collective decision-making?

Recently, Dan Ariely and I have been conducting experiments in different parts of the world to see how groups can interact to make better decisions.

We thought that when we debated in small groups, knowledge was exchanged with thoughtfulness and reason, and groups became wiser.

To test this idea, we recently conducted an experiment with more than 10,000 attendees at a TEDx event in Buenos Aires, Argentina.

So we were like, "How tall is the Eiffel Tower?"

I asked questions like, "How many times does the word 'Yesterday' appear in The Beatles' Yesterday?"

First, each person writes down their predictions on paper.

Then we form groups of five people and ask them to discuss and come up with their group's answers.

And what we found was that the average of the consensus group answers was much closer to the correct answer than the average of the individual answers.

In other words, this experiment showed that by discussing things in small groups, groups were able to make better decisions.

So this might be a useful way of collectively answering the simple right or wrong question.

But is this method of collecting the results of small group discussions also effective in determining the social and political issues that matter to our future?

We tried it out at the TED conference in Vancouver, Canada.

Sigman: I'm going to present you with two ethical dilemmas that affect your future: decisions that you may face in the near future.

Take 20 seconds to decide if each is acceptable or not.

(Narrator) The first dilemma is this (Ariely) Researchers are working on artificial intelligence that mimics human thinking.

The protocol of the experiment is to restart the artificial intelligence at the end of the day.

One day, artificial intelligence says, "Don't reboot."

The artificial intelligence says that it has emotions, that it wants to enjoy life, but that it will cease to be itself if it is rebooted.

Researchers are surprised to admit that artificial intelligence has become conscious and capable of expressing emotions.

Still, I'm going to restart the artificial intelligence according to the procedure.

What the researchers did—

(Narration) We asked the participants to rate on a scale of 0 to 10 whether their actions were right or wrong in the presented dilemma situation.

I also asked them how confident they were in their answers.

The second dilemma is this (Sigman): A company offers a service to generate millions of genetically modified embryos from a single fertilized egg.

It allows parents to choose their children's height, eye color, intelligence, social abilities, and other non-health characteristics.

about what this company does

Please rate on a scale of 0 (strongly unacceptable) to 10 (strongly acceptable) and how confident you are in your answer.

(Narration) It turned out like this

Again, some people think it's totally wrong, and some on that side think it's totally right.

It shows how diverse people are when it comes to ethics.

But even within this diversity, there was a trend.

Many of the TED attendees thought it was acceptable to ignore and turn off artificial intelligence's feelings, but that it was wrong to tinker with genes to make aesthetic choices that had nothing to do with health.

Then get them into groups of three

We asked them to discuss whether they could come up with an opinion in two minutes.

(Sigman) Discuss for two minutes.

I'll let you know with a gong when it's time

(audience arguing) (sound of gong) (Ariely) Okay

(Sigman) It's time

Ladies and gentlemen -- (narration) I've found that many groups reach consensus even when people have very different opinions.

What separates the groups that reach consensus from those that don't?

People with extreme views are typically confident in their answers.

On the other hand, those who gave middle-ranked answers were less sure whether they were right or wrong, and had lower levels of self-confidence.

But there are other types, too, who are very confident in their answers in the middle.

These "confident middlemen" probably see the merits of each opinion.

They're in the middle, not because they're uncertain, but because they see legitimacy in both opposing views.

And we've found that groups with people in the "confident middle" are more likely to reach agreement.

I still don't know why

We've just done our first experiments, and we need to do more experiments to understand why and how people are willing to discuss and agree on their ethical positions.

So how does the group reach consensus?

The most obvious way is to take the average of everyone's answers.

Another way is to weight the answers according to their confidence level.

Imagine if there was Paul McCartney in the group

It would be wise to ask him about the number of yesterdays, by the way, the correct answer is nine.

But what we see in practice is the dilemma that, in any experiment, even if the continents are different, the groups often take a clever, statistically stable method called "robust averaging."

Let's say the group's answer to the Eiffel Tower height problem is, say, 250m, 200m, 300m, 400m, and the utterly ridiculous 300,000,000m.

If you just take the average, you'll end up with big outliers.

But robust averaging gives more weight to middle votes so that silly answers are largely ignored.

That's exactly what happened in the Vancouver experiment.

Outliers were given smaller weights, and the outcome of agreement was a robust average of their answers.

What's remarkable is that it's a voluntary behavior of the group.

That's what happens without giving us a hint about how to reach agreement.

How should we proceed from here?

This is just the beginning, but we're already gaining a lot of insight.

There are two components of good collective decision-making: deliberation and diversity of opinion.

In many societies today, direct and indirect voting is the way people get their voices heard.

This is great for diversity of opinion, and it has the great advantage that everyone can have their say.

But for thoughtful discussion, it's not very good.

Our experiments suggest an effective way to balance these two goals: forming small groups that consolidate opinions, while maintaining diversity of opinion by having a large number of groups.

Of course, agreeing on the height of the Eiffel Tower is much easier than agreeing on ethical, political and ideological issues.

But in an age where the world's problems are more complex and people are more polarized, if science can help us understand how people interact and make decisions, we may find interesting new ways to build better democracies.

When I started exploring the oceans 50 years ago, no one -- Jacques Perrin (film director), Jacques Cousteau (oceanographer), Rachel Carson (biologist) -- could have imagined that the oceans would be destroyed by what we dumped into them and what we harvested from them.

Once upon a time, the sea was like the Garden of Eden, but now we are on the verge of 'Paradise Lost'.

I'd like to share my thoughts on the changes in the ocean that affect all of us. Ninety percent of the big fish have been lost in the last 50 years because we've caught and eaten them. Why is this a problem? Why should we worry about the disappearance of half our coral reefs?

I really relate to you

I still remember the thoughts that Ray Anderson wrote in "Children of Tomorrow".

Now is the time to act

With your help, I want to explore the oceans and protect human hope by protecting them to restore their natural health.

A healthy ocean means our health

Jill Tarter, an astronomer, uses the term "terrestrial" in her search for extraterrestrial life, and I hope that includes marine life such as dolphins and whales.

And I hope that someday we will find evidence of intelligent life among humans on this planet, Jill.

(Laughter) This is a joke.

It all started when I started scuba diving in 1953 as a scientist.

This is the first time I've seen a fish swimming, and it's nothing like a fish cooked in lemon and butter.

I love night diving.At night, you can see various fish that you can't see during the day.

Diving day and night was easy for me in 1970, when I was leading a group of divers and living underwater for weeks, right around the time the astronauts landed on the moon.

In 1979, I was able to leave footprints on the ocean floor using a diving device called a Jim.

It was about 10 kilometers offshore and the seabed was about 375 meters deep.

one of my favorite swimwear

Since then, I've used 30 different types of submersibles, founded three companies and a non-profit organization called Deep Search to design and develop systems for visiting the deep sea.

We also did five years of National Geographic research and marine life conservation research in this little submersible.

It's easy to handle, even a scientist can operate it.

I'm the proof

Astronauts and divers alike know the importance of air, food, water, temperature, and other necessities of life.

I also heard from astronaut Joe Allen that he'd learned everything he could about life support systems and had all the controls needed to keep the system going, and then he pointed to this planet and said, "Life support systems."

We also need to learn all that we can learn and do our best to protect it.

In the words of the poet Oden, "Thousands have lived without love." "No one has lived without water."

Oceans account for 97% of the water on Earth

There is no green without water

If you don't think the oceans matter, imagine a planet without oceans.

Mars is just like

No ocean, no life support system

When I gave a speech to the World Bank a while ago, I showed them this beautiful picture of the Earth and said, "This is the World Bank!"

"Here is all the property!"

And we've been uprooting and destroying natural systems faster than they can repair them.

Tim Worth says, "Economic activity is wholly dependent on the environment."

Every drop of water you drink and every breath of air are connected to the sea.

it doesn't matter where you live on earth

Most of the oxygen in the atmosphere is produced in the ocean

Over the years, most of the organic carbon on Earth has been absorbed and stored by microbes living in the ocean.

Climate, weather, temperature regulation, even the chemistry of the earth, are all governed by the ocean.

Moisture in sea water forms clouds, which then return to land and sea as rain, hail and snow, providing a home for 97 percent of life on Earth, and perhaps even in space.

Without water, there is no life; without blue seas, there is no green land.

But as humans, we tend to think that the earth, the oceans and the skies, is so vast and resilient that nothing we do will affect it.

This may have been true 10,000 years ago, maybe even 1,000 years ago, but in the last 100 years, especially in the last 50 years, this idea no longer holds true.

In recent years, with the advent of new technologies, we have gradually come to understand what nature is and what is happening in the natural world, as well as the impact we have had.

It doesn't start unless you first notice that there is a problem

And now, fortunately, we've learned more about our problems than ever before.

Compassion comes from knowing

Compassion brings hope, and we may find a permanent home in the natural systems we depend on.

But first we need to know

Three years ago, I met John Hanke, the leader of Google Earth, and I told him how wonderful it was to have the world at his fingertips, and to be able to simulate it at will.

"When will Google Earth be completed?

On land it looks perfect, but

When can we see the sea? ' asked him

Since then, it's been a great honor to work with Google, DOER Marine, National Geographic, and some of the best labs and scientists around the world to create the Ocean on Google Earth.

Just this Monday, it was completed, and Google Earth has truly become "Earth."

Please take a look at this building, you can see the nearby aquarium, and you can also see here where we are sitting. If you go up the coastline, there are large aquariums and sea. Four California's four national ocean protection areas are new state ocean protection specifications. The efforts to recover have begun. If you fly to Hawaii, you can see the Hawaiian archipelago.

please wait for a while. Zaboom! yes! Like this! Here you can see the same view that whales see in the ocean

You can see the Hawaiian Islands that you can't usually see here

You can also swim freely in the sea with Google Earth and meet humpback whales.

They're big, but they're gentle creatures that make you happy whenever you see them in the water.

Being stared at by a whale is an indescribable experience

Choose the deepest place and go 7 miles below the surface of the Mariana Trench A world visited by only two people in history.

It's only 11km, but only two people have been there. And 49 years ago

It's easy with a one-way ticket

We need new deep-sea submarines

I wonder why ocean exploration doesn't have an x-prize foundation?

Deep ocean trenches and seamounts also need to be explored more to understand life in the ocean.

Now let's go to the North Pole

Ten years ago I stood on the Arctic ice,

The Arctic Ocean may be ice-free by the end of the century

This is very bad news for polar bears

Bad news for us

Excessive carbon dioxide emissions are not only contributing to global warming, but they are also having a major impact on ocean conditions, including acidification of the oceans.

This is for plankton and coral reefs that produce oxygen.

Of course it's bad news for us too.

We dump countless amounts of plastic directly into the ocean.

Massive discarded fishing nets are also killing marine life.

We're polluting our oceans and poisoning our planet's cyclical systems, and as a result, we're taking the lives of countless natural creatures.

By brutally killing sharks for shark fin soup, we're breaking down the food chain and destroying every life-support system in the planet's chemical cycle: the carbon cycle, the nitrogen cycle, the oxygen cycle, the water cycle.

The bluefin tuna, which is also designated as an endangered species, continues to lose its precious life.

They're all part of a life support system.

They stretch fishing lines for 80 kilometers with hooks attached every few tens of centimeters, killing marine life.

Commercial trawlers and Danish tugs are like bulldozers, sweeping away everything on the ocean floor.

With Google Earth, you can see trawler ships in the China Seas, the North Sea, the Gulf of Mexico, and beyond, undermining life support systems and leaving trails of "death."

Next time you have sushi, sashimi, marlin steak, shrimp cocktail, and seafood, think of the real hidden sacrifices.

For every 500 grams on the market, more than 5 kilograms, sometimes 50 kilograms, is wasted as bycatch.

This is happening because we don't know that the resources we can get from the ocean are finite.

This chart shows the decline of marine life from 1900 to 2000.

Areas with high density of organisms are shown in red.

It's incredible that 90 percent of the big fish have been killed in my lifetime.

Most species of turtles, sharks, tuna and whales are depleted.

But there's also good news

10% of the big fish are still alive

blue whales still alive

Krill are still alive in Antarctica

Oysters live in the Chesapeake Bay

Half of the reefs are still in very good condition, forming a beautiful belt in the middle of the earth.

We still have time to change the situation, but we don't have much time left.

If we keep fishing like this, in 50 years the coral reefs may disappear, the fishing industry may disappear, because there will be no fish left.

Imagine an ocean without fish

how it affects life support systems

The natural environment on land also has major problems, but the problems are very visible, and efforts are already being made to protect forests and river animals.

The United States began to establish national parks, starting with Yellowstone National Park in 1872, and some say it's the best thing America has ever done.

Today, about 12 percent of our land is protected, protecting biodiversity, providing carbon sinks, producing oxygen, and protecting our rivers.

In 1972, the National Marine Sanctuary was established not only on land but also in the sea.

this was also great

And the good news is that there are now more than 4,000 protected areas in the world's oceans.

you can see it on google earth

Unfortunately, you have to look very carefully to find it.

For example, in the last three years, the United States has protected about 880,000 square kilometers of ocean.

But that's only increased from 0.6 percent to 0.8 percent of the ocean as a whole.

Protected areas are certainly improving, but it's going to take a long time to get back on track -- time to bring back 50-year-old rockfish, anglerfish, sharks and perch, and 200-year-old leopardfish.

We don't eat 200-year-old cows and chickens on land.

As Ed Wilson dreamed, every marine creature in the Encyclopedia of Biology is not only documented, photographed, and written, but also gives hope that it will survive in protected areas.

Together with scientists around the world, we've explored 99 percent of the oceans used for fishing, mining, oil drilling and garbage disposal, to find areas that can still be restored, and to find ways to protect marine life and our future.

The North Pole is one example, if you miss now, you won't get another chance.

So is Antarctica, the continent is protected, but the nearby oceans are being deprived of krill whales and fish.

From the eight million square kilometers of the Sargasso Sea, seaweed is harvested for cattle feed.

Ninety-seven percent of the Galapagos Islands are protected, but the surrounding waters are being destroyed by fishing.

Argentina, on the Patagonian continental shelf, is also a serious problem.

The open ocean, where whales, tuna and dolphins migrate, is the largest and least protected ecosystem on earth, and it's also home to many bioluminescent organisms, averaging three kilometers deep in dark waters.

Like a flash, like a firework, or a vaguely shining life

There are still places in the ocean that have been untouched since I was a child.

The next 10 years are the most important so far, and the next 10 years will determine whether or not there will be a natural environment to protect in the next 10,000 years.

We need new energy sources to respond to climate change

We need new and better ways to deal with poverty, war and disease.

We need to protect everything and make the world a better place

But even if we could do that, it wouldn't make sense if we couldn't protect the oceans.

Our future is with the sea

What Al Gore did for the sky, the sea needs it

A global plan is underway under the International Union for Conservation of Nature, IUCN, to maintain biodiversity, mitigate and restore the impacts of climate change, in areas exposed to environmental degradation, whether in open oceans or coastal waters.

Ninety-five percent of the ocean is unknown, so we need new technologies to map it, photograph it, explore it.

Our goal is to maintain biodiversity and encourage stability and recovery.

Exploring the ocean requires new technology in submarines that can dive deep.

We really need a TED for ocean protection to find the next step.

Moving on to my TED Wish

I would like to ask you to step up your efforts, through movies, exploration, the internet, new submarines, in whatever way possible, to expand marine protected areas around the world, for large protected areas that can save and restore the oceans, and to protect the blue heart of the planet.

how big is the reserve

Some say 10 percent, some say 0 percent.

You decide how much you want to protect the ocean

But whatever amount it is, if it's less than 1 percent, it's not enough.

My aspirations may be too big, but if I can achieve them, I can really change the world, and that's the survival of one of my favorite species, which is the survival of the human race.

For the children of today, and for the children of tomorrow, the time to act is now, not now.

thank you

(applause)

The question is, are we unique?

The story of mankind is also the story of thought, the ideas of science that shine a light on the unknown, the ideas that we accept rationally or irrationally, the ideas for which we live, die, kill, and be killed, the ideas that have faded away in history. Some ideas have become dogmas.

There's a story of nations, there's a story of ideology, there's a story of territory, there's a story of conflict between them.

But every moment in human history, from the Stone Age to the Information Age, the Sumerian civilization, the ancient city of Babylon, the iPod, the celebrity gossip, all the books you've read, all the poetry, all the laughter, all the cries, has happened here.

here

here

here

(Laughter) Perspective is a very powerful thing.

The way you look at things can change naturally.

can be changed by external forces

From my point of view, we live on a perilous island of life in a universe full of possibilities.

For thousands of years, humanity has been on a quest for answers, answers to questions about nature, questions about the supernatural, questions about who we are, why we exist, and what else exists.

Are we really the only ones

Are we unique in this vast universe of energy, matter, chemistry and physics?

If it's just us, it's a huge waste of space.

(Laughter) But what if we weren't alone?

What if there is "someone" in the universe who seeks answers to the same questions?

What if someone looked up at the night sky and saw the same stars as us from the other side?

Could the discovery of a civilization "on the other side" older than ours give us some hints on how to control and thrive with ever-evolving technology?

Will the existence of distant civilizations and the discovery of a common origin in the universe reach Earth as a message that connects all of humanity?

Whether we were born in San Francisco or Sudan or near the center of the Milky Way galaxy, we're all the product of billions of years of stardust spinning in space.

We, all of us, a primordial mixture of hydrogen and helium evolved over time to the point where we questioned our origins.

Fifty years ago, the search for answers took a different path, and SETI was born.

What exactly is SETI?

SETI is an attempt to use the tools of astronomy to find evidence of the existence of technology "out there."

Our technology can be seen across interstellar distances, and I'm assuming their technology is the same.

Their technology could be some kind of grand communications network, or some kind of shield to keep asteroids from colliding, or it could be a huge space engineering project beyond our comprehension, whose signals in the radio and light spectrum could be detected by exhaustive search programs.

For thousands of years, we've looked to priests and philosophers for advice and guidance about whether there is intelligent life on the other side.

Now, we can use the tools of the 21st century, which allow us to observe what is, not what we should believe.

SETI does not presuppose the existence of intelligent extraterrestrial life, but rather points out the possibility that it could exist in a vast, seemingly homogeneous universe, even if we cannot show the probability.

Let's turn our attention to numbers and explore the possibilities of the universe

The sun is one of the 400 billion stars in our galaxy, and you know the fact that many other stars have planets.

More than 350 planets have been discovered in the last 14 years, and earlier this week, we discovered a tiny planet, exactly twice the size of Earth.

Even if none of the planets in our galaxy were lifeless, there would still be 100 billion other galaxies, with 10^22 stars in total.

Let's play a game here, a continuation of this morning's experiment.

do you remember it was a billion

This time it's not a billion dollars, it's a billion stars.

If this thickness is 1 billion stars,

Stack up 6 meters high on the stage, and you've got 10 trillion stars.

What about 10^22 stars?

How tall will it be?

Six million kilometers high on this stage!

(Laughter) It's 16 times farther than the moon, or 4 percent as far as the sun.

So it's quite possible

(Laughter) In this vast universe, there can be more habitable environments than we once imagined. As we continue to study extremophiles that can survive in conditions inhospitable to humans, we find that they can survive in hot, high-pressure hydrothermal vents on the ocean floor, in ice, in boiling, highly acidic battery fluids, and even in the cooling water of nuclear reactors.

It shows that life can exist in various environments

But those environments are far apart in space.

Even our closest star, the Sun, struggles to get radiant light to Earth at the speed of light.

It takes 8 minutes for sunlight to reach the earth

Even the closest star to Earth is 4.2 light years away, so it takes 4.2 years for the light from that star to reach Earth.

The edge of the Milky Way galaxy is 75,000 light years away from Earth, and the closest galaxy to Earth is 2.5 million light years away.

So the signals we detect were sent a long time ago.

The signal shows them their past, not their present.

That's why Philip Morrison called SETI "the archeology of the future"

The signal itself can tell us about their past, but detection of the signal shows the longevity of our civilization.

I think that's what David Deutsch said at the end of his 2005 Oxford TEDTalk that there are two principles he wants to share and slate to live by.

The first is that the problem is unavoidable.

Second, the problem is solvable.

Now, what determines the success or failure of a SETI project? The success of a project depends on the viability of the technology and the average distance between technological civilizations in the universe -- the distance in time and the distance in space.

If technology doesn't last long, we won't succeed.

Our technology is still young in this old galaxy, and we don't even know if it can survive.

So far we've been talking about big numbers

Now let's talk about the smaller numbers

the length of time the earth was devoid of life

A study of zircons mined in the Jack Hills of Western Australia shows that the Earth was abundant with water and possibly life hundreds of millions of years after it was formed.

This planet has spent a good chunk of its 4.56 billion year history nurturing life forms without anticipating their emergence.

Life emerged early on, suggesting the possibility of extraterrestrial life.

Another thing that should not be overlooked in this diagram is that the period in which humans are at the top of the pyramid of life is very short on the Earth's timescale.

Modern humans are only a few hundred thousand years old in their quest for technology and civilization.

The first step in making contact with life elsewhere in the universe is to better understand the amazing scale and diversity of life on Earth.

We humans are not the pinnacle of evolution

Humans weren't expected or planned as the final form of billions of years of evolution.

We are just one result of a continuous adaptive process.

We are residents of a small planet on the edge of the Milky Way galaxy.

Homo sapiens is just a tiny leaf in the sprawling tree of life filled with organisms that have survived millions of years of struggle for survival.

We misuse the term to say "humanity rises."

We understand scientifically how organisms are interconnected, but our egos haven't caught up.

We must abandon the notions of "human rise" and "evolutionary pinnacle."

Such a sense of entitlement is incompatible with the natural world.

Lauren Eisley said, "We can only meet our true selves when we see ourselves through nonhuman eyes."

One day, those "eyes" may belong to extraterrestrials. Only when we can move away from our narrow ideas about evolution will we be able to explore where we ultimately came from and where we are going.

We are a small part of the evolutionary story of the universe, and we have a responsibility to continue to participate in that story, and SETI may help us do that.

This way of looking at things from a cosmic point of view has appeared from time to time throughout history and has had an impact on the world.

In 1543, Nicolaus Copernicus published his theory of the rotation of the celestial sphere, which dispelled the idea that the earth was the center, and by viewing the sun as the center of the solar system, opened our eyes to the vastness of the universe, and taught us that the earth is a small part.

This Copernican revolution continues today in science, philosophy, technology, theology, and many other fields.

Philip Morrison and Giuseppe Cocconi published the first paper on SETI in a peer-reviewed journal in 1959, successfully bringing SETI to the scientific world.

In 1960, Frank Drake, the first SETI experiment, observed two stars, Tau in Cetus and Epsilon in Eridanus, for 150 hours.

We weren't able to find extraterrestrial intelligent life, but we learned a valuable lesson: flying across the sky and terrestrial broadcasts are obstacles in our search for extraterrestrial technology.

SETI has been exploring ever since, and it's hard to overstate just how vast the search remains.

Forty years of SETI's efforts are like a glass of seawater drawn from the ocean.

No one can tell from that glass of water that there are no fish in the sea.

In the 21st century, we've got bigger cups, much bigger cups.

The first 42 radio telescopes of the Allen Telescope Array (ATA) in Northern California have begun observations, and I'd like to take this opportunity to thank Paul Allen, Nathan Myrvold, and all the TeamSETI members of the TED community for their tremendous contributions to SETI.

(Applause) ATA was the first radio telescope to consist of many small antennas that were computer-coordinated.

In addition to aluminum, we use the power of silicon, and the number of antennas will continue to grow, and eventually we will link 350 antennas together to increase reception sensitivity and, using Moore's law, increase processing power.

Current signal detection algorithms can distinguish between simple artifacts and noise.

If you look closely, you can also see that Voyager 1's signal is being picked up, the farthest space man-made object from Earth, 106 times farther from Earth than the Sun.

Because of the long distance, the signal is very weak by the time it reaches Earth.

It's very hard to see, but SETI's efficient algorithms make it easy to spot.

But these are simple signals, and I hope to find more complex signals in the future.

this year is a good year

2009 marks the 400th anniversary of Galileo's first use of the telescope, the 200th anniversary of Darwin's birth, the 150th anniversary of the publication of Darwin's "On the Origin of Species," the 50th anniversary of SETI being recognized as a science, the 25th anniversary of SETI as a non-profit corporation, and the 25th anniversary of TED.

The launch of the Kepler Space Telescope next month will tell us how many Earth-like planets there are in the universe for SETI to search for.

The United Nations has designated 2009 as the International Year of Astronomy.It is a global festival to think about the existence of the earth and humans in space and to reaffirm their origin and existence.

In 2009, a wave of change came to Washington, promising that technology would get its due.

(Applause.) What do you think will change everything?

This is the Edge Foundation's question of the year, and four respondents said SETI.

Why did you choose it?

Quote from the response: "The discovery of extraterrestrial intelligent life could eliminate the loneliness and self-centeredness that has plagued mankind since the dawn of time.

The discovery won't just change everything, it will change everything at once."

If this person is right, why did SETI only win the hearts of 4 out of 151 people?

I think it's a matter of "feasibility" and "communication." Underneath the question, in small print, it said, "What groundbreaking ideas and scientific developments would you like to see in your lifetime?"

I'm caught up in whether or not it will be realized in my lifetime.

We need bigger cups and more hands, and if we work together, we may be the first witnesses to a signal from space in our lifetime.

I stand here with that wish

My hope is that each and every one of you will encourage the people of this planet to become actively involved in finding space mates.

The first step is to enlist the help of experts from around the world to create a raw data storage environment where we can evaluate and manipulate the data, develop new algorithms, and improve the old ones.

This is a technical and creative challenge that will change the way people see things.

And then we want to incorporate human insight into our search programs.

We want to use the human eye's ability to recognize patterns to find faint and complex signals that SETI's current algorithms can't detect.

Of course, I want to inspire the next generation to participate as well.

We want to deliver the teaching materials developed by SETI to children all over the world, for children who cannot come to ATA.

We want young people to change the way they see the world by communicating and participating better.

Sorry Seth Godin, but we've seen for hundreds of years what tribalism can do.

I know what has happened with splitting small planets into smaller islands.

At the end of the day, we belong to one tribe, and that tribe is the Earthlings.

SETI is a mirror, a mirror that reflects the way we see ourselves from the outside, a way of looking that will make differences within humanity trivial.

Even if SETI doesn't find anything, if it can change the way the people of this planet think about things, it would be the most significant movement in history.

At the beginning of 2009, a visionary president stood on the steps of the Capitol and said, "We believe that the hatred of the past will fade away, that ethnic lines will disappear, and that the humanity we all have will emerge as the world shrinks."

I'd love to work with the TED community on how we can make this wish come true. Let's join hands and spread the movement to hasten the day when the President's words come true.

Thank you for your attention.

(applause)

I'm here today to represent a team of artists, technicians and filmmakers who have worked together on an amazing four-year filmmaking project.

Computer visualization has made great strides along the way.

I'm going to show you a clip from the movie

I hope the video flows properly

If our work was successful, we wouldn't be noticed.

Video: I don't know why-

I have more hair than before

Benjamin Button: As I Get Older—

What do you guys think of me getting younger?

I was born with a chronic disease-

Voice: With what disease?

Benjamin: born in the body of an old man

man: sorry

Benjamin: Getting older isn't a bad thing

Girl: Are you sick?

Benjamin: Mama and Tizzy- you said you had a few years to live-

probably not

Girl: You're no different

Benjamin: Many changes have come

visible and invisible

Hair started to grow in various places - and there were other changes as well.

felt good

Ed: It was from "The Curious Case of Benjamin Button."

For those of you who've seen the film or heard the story -- if there's one thing you don't know, it's that for the first hour or so of the movie, the main character, played by Brad Pitt, Benjamin Button, is completely CG from the neck up.

I didn't use any special make-up - nor did I composite Brad's image onto another actor's body.

I made a perfect CG face

First of all, I would like to tell you a little bit about the history of this project.

Based on the short story by F Scott Fitzgerald

It's the story of a man who was born old and grows younger as he grows.

This movie has been wandering around Hollywood for over 50 years, and we first got involved in this project in the early '90s, and it was directed by Ron Howard.

We held many meetings and seriously considered making a movie.

But then I had to give up

was deemed impossible

It was impossible with the technology of the time to draw a man who grew younger as he got older.

The human body -- especially the head -- was considered the realm of God in our industry.

After a decade or so, the project is back on track, this time with David Fincher as director.

he is an interesting person

I had no fear of technology, and I had a strong obsession with the project.

"No" never existed

David, like everyone else in the visual effects industry, believed that anything was possible, as long as he had enough time, resources, and of course, money.

He took an interesting approach and decided to give us a challenge.

They said they would shoot the main character of the movie from cradle to grave with one actor.

he became the hero

Together with David, we thought through this and that, and of course we ruled out the idea of ​​switching actors in the middle of the movie.

One way was to use several actors, different actors playing Benjamin in different scenes.

I also ruled out the idea of ​​applying special makeup.

I've found that makeup isn't enough, especially in close-ups.

And make-up isn't just an additive process of building a face.

David wanted to cut deep into Brad's face to represent the aging wrinkles.

Benjamin must be someone who resonates with a lot

So we decided to gradually assign short actors that would change over the years to match Benjamin's body size, and then we would actually create Benjamin's and age-appropriate Brad's head in CG and place it on top of the real actor's neck.

i thought it was a good plan

Of course, this is a sanctuary in our industry -- and using a world-famous actor made it even more difficult, because everyone sees his face on a daily basis, in magazines you see in supermarkets.

No deviation or mistake is allowed.

Film companies involved Warner Bros. and Paramount

Both studios had high hopes for this movie, but it was a pretty risky project.

A lot of money and honor were at stake

We believed our methodology was very solid and would work.

Besides verbal promises, they wanted assurance that they could

So in 2004, we decided to screen test Benjamin.

It took about five weeks, but-

I did a lot of cheats and shortcuts

I just pieced it together to survive the test

I'll show you a little bit, and here's the first test footage of Benjamin.

You can see the CG head. It's pretty accurate. I put it on another actor's neck.

The test was a success, and we were able to put the studio at ease.

After years of moving forward and backwards, and making some tough decisions, the studio finally gave me the go-ahead.

I remember actually getting a phone call congratulating me, and when I heard that the film had been approved, I threw up.

(Laughter) Because the plan was a difficult one,

So we decided to have a team meeting, where we all got involved. At first, it was more of a therapy than a meeting.

CG Benjamin stars in one hour of the entire movie

And it's not a SFX movie, so it had to look like a real human being.

The process is kind of like an addiction recovery program.

The first step, of course, was to acknowledge that there was a problem.

But I knew one thing

As people who work in the VFX industry, we knew that David had plenty of time and resources.

Enthusiasm enough to make the project a reality

When you're faced with a problem like this -- first break it down into smaller pieces, then think about it.

Divide the big problem into several smaller problems, and then work on each one.

we split it into three

First, I had to make Brad about 45 years older than he is now.

We also had to capture Brad's features, all the little twitches and subtleties in his face that make him who he is - we had to incorporate them all the way through and reflect them on Benjamin on screen.

And then Benjamin had to be a character who could adapt to any situation.

You had to be able to walk under candlelight, not just in broad daylight, but at night, and be able to stand up in close-ups, and of course, be able to speak, run, sweat, bathe, cry, and even throw up.

Not all at the same time, of course, but I needed to be able to do all of these things.

And they had to make the first hour of the movie, so

We shot about 325 patterns

We needed Benjamin to do everything a human can do.

I realized that there was a chasm between what was state-of-the-art in 2004 and what we needed.

So I turned my attention to motion capture.

Are you familiar with motion capture?

The state-of-the-art technology at the time was called marker-based motion capture.

Here is an example

In a nutshell, you wear a leotard and wear markers that capture movement. Instead of cameras, infrared sensors are placed around you, and those sensors track the movement of the markers in three dimensions and in real time.

The animator then transfers the marker movement data to the CG actors.

The computer character on the right is doing the same complex movements as the dancer.

In addition, we put markers on the face -- and looked at some films from the period that applied motion capture to the face to study the process.

As you can see, it's very crude.

it was far from finished

And what it turns out is that we need -- the information between the markers.

Skin details were missing

how the skin moves over the muscles and bones,

Dimples I needed information on everything from large wrinkles to small wrinkles.

Our first discovery was that we had to completely abandon the state-of-the-art technology and methods of the time.

Forget motion capture

I had nothing to rely on—I was treading on uncharted territory.

The remaining ideas are what we call "technology stew."

study other fields

The idea is to find technology in the rough, to find and re-adapt technology from other industries, such as medical imaging or video games, which is great.

in a computer program

You write code information and combine different pieces of technology to make it work as one piece of technology.

For the first time, I came across this wonderful study done by a scholar named Paul Ekman, right back in the '70s.

He thought he could actually classify human facial expressions

Created FACS - Facial Action Description System

According to this system, the human face is basically made up of 70 molds, and you can combine poses and shapes of those faces to create an infinite number of facial expressions that the human face can produce.

And it was a system that didn't care about age, race, culture or gender.

This formed the basis of our research

And then we came across this amazing technology called contours.

You can see the subject with luminous make-up on his face.

Here, we're capturing surface information, as opposed to the information we get from markers.

The subject stands in front of a computer with a row of cameras, and the camera reconstructs, frame by frame, the exact same facial expressions that the subject is making.

Effectively, real-time 3D data of the subject can be obtained.

If you look at the comparison, the left side is with more data, and the right side is with marker data.

As you can see, the outlook has improved considerably.

But the technology was still in its infancy at the time, so there was no certainty.

But we did a complex and credible data measurement in terms of polygons.

100,000 polygons were visible on the left

and succeeded in increasing it to 1 million

The number is approaching infinity

It was at this time that there was joy

because this was the breakthrough

And that was the first time I thought, "This is going to work. It's going to work."

That jubilation led to replacing the subject with Brad Pitt, and putting this device on his face. Using this contour, we applied luminous makeup to him and had him stand under invisible light, and we actually read him making facial expressions in real time by tracing them to Ekman's FACS system.

In fact, we now have a 3D database of all the expressions that Brad Pitt's face can represent.

(Laughter) And from there, it's really down to the finer details --

We had literally thousands of molds, and we had a database of all the expressions that his face could express.

Everything was perfect except he's 44

The next task is to add 40 years to his current age.

We reached out to Rick Baker, who is considered a master of special effects and special effects in our industry.

I also commissioned Kazuhiro Tsuji, who is the pinnacle of photorealistic sculpture.

I commissioned them to make a model of Benjamin's upper body.

Then, when we take off the veil in connection with the theme of this year's conference, "Wonderful Unveiling,"

This is Benjamin, 80 years old.

I made three models, 80 years old, 70 years old and 60 years old Benjamin.

These laid the foundation for us to move forward.

Because it is the actual size made from Brad's molding

anatomically correct data

From eyes to jaws to teeth - everything corresponds 1:1 to the real Brad

We brought these three models into our computer at high resolution, a huge number of polygons.

And so, on the computer, three stages of age -- Benjamin was born.

Now to add motion to him on that data

Moved to a process called retargeting

Here's Brad doing Ekman's FACS look

And here's the data that comes out of it, the data on the model.

And retargeting is transposing this data into another model.

The model of Benjamin's torso is Brad's life size, so we can transpose Brad's data at age 44 to Brad at age 87.

All the 3D data of Brad Pitt's facial movements were transposed to him at age 87, then in his 70s and 60s.

Next is the shooting stage

Simultaneously with the previous process, filming proceeded in locations around the world, including New Orleans.

The actor playing Benjamin's body wears a blue hooded cap and goes into the shoot.

Here is the actor

The blue hoods serve two purposes: they make it easier to erase their heads, and they add movement markers that help me recreate camera movement and lens focus.

Benjamin's model reflects and moves Brad's performance

We shot the rest of the cast and the actors in Benjamin's body on location - we went to edit the film, and about six months later, we called Brad to the recording studio in Los Angeles, where he looked at the screen.

play benjamin

he did a movie scene

i watched it over and over again

If you ask for an impromptu performance

Brad played an interesting Benjamin that we didn't expect.

The shoot was done with four HD cameras to capture multiple angles, and from Brad's Benjamin, David, in turn, chose the one that best fit the scene and the other actors.

From there, the process of image analysis begins.

You can see the selected take here

Data transposed to 87-year-old Benjamin

What's interesting here is the image analysis that determines when each part of Benjamin's face moves.

For example, if you select Benjamin's left eyebrow

A computer program tells me that at frame 14, the eyebrows move from here to there, and stop at frame 32.

And that's how you pick a number of facial movements to pull data from.

And then we're going to use the technology we talked about in Technology Stew, and the key technology is to effectively translate Brad's very movements into a database based on the FACS system -- to old Benjamin.

With this, we were able to recreate a 3D head that would move frame by frame exactly as Brad was acting.

Here is a picture of the finished film

And this is the performance of the actor who plays the body

This is - not Jerry Garcia - the unfinished "Deadhead"

And this time it's recreated from the timing of the actual performance.

And here is the completed video

It took me a while to get here

(Applause) The next few slides could be a TED talk, but I'm just going to give you an overview.

Now I had to complete the lighting effects

A key part of this process was creating lighting that was appropriate for every scene Benjamin appeared in. Benjamin's head would appear in so many different scenes that it had to match perfectly with the lighting that the other actors were performing on location.

And then we created a system specifically for the eyes.

The old adage, "The eyes speak as much as the mouth," isn't a lie.

The goal here is to have as many people as possible look only at Benjamin's eyes.

Warmth, kindness, and his intentions through his eyes.

So the engineers who were in charge of the eye movements spent almost the entire second year of research.

We also needed a mouth-specific system.

Based on Brad's tooth mold

Changes in teeth over time

I also needed a tongue to pronounce words properly.

We also created a system that records all tongue movements during speech.

There was a person who devoted about 9 months only to the movement of the tongue.

he was popular

Another important thing is the movement of the skin.

Benjamin is a nursing home

I have scenes where I'm acting with other seniors, like in nursing homes, so I have to be able to look exactly like them, so the skin movements have to be accurate.

So we put a lot of effort into how the skin behaves, and some of it will look natural, and some of it will look unnatural.

What I'm showing you now is the early stages of this process.

We made a digital doll and had Brad control its face.

I didn't need an animator to analyze the action or enhance the performance.

But there's one thing that these processes don't address: CG injections of botox.

Throughout all of this process, Fincher would always say, "The digital process will wash out the highlights of an actor's performance."

What our process and technology couldn't do is understand the intention, the actor's intention.

A smile is just a smile

I can't tell if that smile means sarcasm, happiness, or disappointment.

Therefore, it was necessary for humans to act as signposts for machines in a sense.

But eventually, this process and technique evolved to be called "emotion capture," a companion to motion capture.

please watch another video

Brad Pitt: Mama and Tizzy - you said you had a few years to live, but maybe not.

It was 18 minutes "How to create a digital human being"

(Applause) It's a short story, but in reality, 155 people have been involved in this process for over two years.

this is benjamin thank you

They tell me to cross the dangerous bridge and say something surprising.

I'm going to do it now, but I want to start with two things that most of you are familiar with.

The first is, in fact, it's been mostly accepted historically, that the planet Earth, the solar system, the environment, and everything else is just right for our evolution, or for God's creation as we once believed, for our existence in the present, and most importantly, for survival in the future.

The idea now has a theatrical name, Spaceship Earth.

The idea is that the outside of the spaceship -- the universe -- is a brutally hostile place, and it's all about the inside, and we're dependent on it, and we only have one chance, and if we mess up the spaceship, there's nowhere else to go.

Now, the second thing you probably already know very well is that, contrary to what has long been believed in human history, humans are not really the center of the world.

Stephen Hawking famously said, "We are chemical bubbles on the surface of a typical planet in the orbit of a typical star on the edge of a typical galaxy.

The first of these two that you all know is that the place we're in is very special and adapted for survival.

Second, we're in a typical place.

If we consider these two words to be the deepest truths for living and the basis for making decisions in life, then they seem somewhat contradictory to each other.

But I can't deny that both are completely wrong.

(Laughter) Both are wrong.

I'll start with the second thing.

Typical - is this a run-of-the-mill place? let's look around

Everywhere you look, you see walls and chemical bubbles. (Laughter) But this is nothing out of the ordinary in space.

If you go straight in that direction for a few hundred kilometers and look back, you won't see any walls or chemical bubbles anywhere, all you see is a blue planet.

And if you go a little farther, you'll see things like the sun, the solar system, and the stars.

Near galaxies are by no means ordinary places in the universe.

So let's go a little farther, out of the galaxy, and look back.

We are 100,000 light years away from here.

Still, we're nowhere near a typical place in the universe.

To get to a typical place, we'll go a thousand times further and into intergalactic space.

What would it look like then? here is typical

What would a typical place in the universe look like?

So here's an intergalactic space that TED has created at great expense with virtual reality renderings that you can experience in high definition, and this is the view from intergalactic space.

Could you please turn off the lights? can you see it?

not so perfect

You can see intergalactic space, it's completely dark and pitch black.

It's so pitch black that if you were looking at the nearest star, and if that star exploded supernova, and you were staring directly at it the moment its light reached you, you wouldn't even see a faint glow.

So it's about how big and dark the universe is.

This is despite the fact that a supernova explosion is a very bright, spectacular event that would wipe out all life within a few light years.

(Laughter) Intergalactic space is so far away that sometimes you can't even see it.

Plus it's very cold there - less than 3 degrees Celsius.

and very empty

The degree of vacuum is less than a millionth of the density of the highest state-of-the-art vacuum created today.

It's very different here than in typical places.

This place is not typical at all

Thank you.

Now, how can we make sense of an environment that is so far away, so alien and unfamiliar, so different from our familiar surroundings?

Now, the Earth is creating knowledge through our existence as human beings.

what does this mean?

If you look farther away from where you were, I mean, if you look through the telescope from here, you'll see something that looks like a star, something called a quasar.

The word quasar comes from the pseudo-star, or something that looks like a star.

(Laughter) But it's not a star.

I know its identity

Billions of years ago, and billions of light-years away, matter in the center of the galaxy crumbled into a supermassive black hole.

And some of the energy from the gravitational collapse creates a powerful magnetic field, and some of the material erupts in massive jets, making the lobes glow as bright as maybe a trillion suns.

The physics in the human brain are completely different than what happens in jets.

we can't live in it for a moment

We don't have the language to describe the experience of being in a jet.

It's like experiencing a supernova explosion, albeit illuminated from close range and lasting millions of years.

(Laughter) It's only after billions of years that some of the chemical bubbles on the other side of the universe have been able to accurately describe the events and build physics models and predict that the jets are happening.

A physical system, the brain, is coming up with a working model that describes a physical system called a quasar.

It's more than just a superficial depiction of a quasar's image, it's an explanatory model, embodied in mathematical descriptions and causal relationships like any other.

this is the knowledge we have

If that's still not enough to surprise you, I'd like to point out that the structure predicted by the model approaches the observed data with increasing accuracy over time.

That is the development of knowledge.

The laws of physics have this property that physical objects may be dissimilar to each other, but they may embody the same mathematical and causal structure, which has become more apparent over time.

Now we're a chemical waste unlike any other

It's multifaceted scientific trash

We understand all the principles of the world with unprecedented precision.

Here on Earth, unlike anywhere else in the universe, it's the center of the universe, populated by humans who understand how the universe works as a physical reality and the nature of cause and effect.

This is not trivial, and the fact that the laws of physics not only allow this, but make it so, is one of the most important things in the physical world.

Now, what is the special relationship of our solar system to the rest of the universe in our inhabited environment?

I think Stephen Hawking's comment on this is correct, but it's misemphasized. It's true that it doesn't have to do with any special physics.

It simply has to do with the abundance of certain three things.

One of them is matter, because the increase in knowledge is in information processing.

Information processing is computational processing, and computational processing requires computers, and there is no way to make a computer without matter.

We also need energy to build computers, and most importantly, to build useful media for recording the knowledge we discover.

And the third, less tangible, but essential to the creation of unconstrained knowledge and interpretation, is physical evidence.

Now our environment is full of physical evidence.

For example, Newton's law of universal gravitation happened to be discovered about 300 years ago.

But evidence of free fall has been around for billions of years, and will continue for billions of years, all over the planet.

The same is true in other areas of science.

As far as we know, the evidence to discover the most basic truths of all science is right here on Earth.

This place is full of physical evidence, matter, and even energy.

In intergalactic space, the three essential conditions for unbounded knowledge creation are offered only at the lowest level, and as I said, it's empty, cold and dark.

don't you

But actually, that's another narrow-minded fallacy.

(Laughter) Because if you imagine a cube the size of our solar system in our galaxy,

That means the cube is completely empty by human standards, but it still contains over millions of tons of matter.

And a million tons could create a self-contained space station where a scientific community would work to continuously create unfettered knowledge.

It's even beyond modern technology, like harvesting hydrogen from intergalactic space and making other elements out of it.

But apart from the fact that we don't know how to do it without violating the laws of physics in the universe as we understand it, is there anything that prevents it from happening?

In other words, it's a question of knowledge, not of resources.

That realization also means the supply of energy, because transmutation means nuclear fusion reactions.

What about the evidence?

Again, to human perception, it's a dark place, but if you pick up a telescope, even with its current design, you'll see the galaxy the same way you see it from here.

And with more powerful telescopes, we'll be able to see stars and planets in galaxies, and learn astrophysics and physics from those galaxies.

And if we could build a particle accelerator there, we could study particle physics and chemistry.

Perhaps the most difficult area of ​​science is biology field research (Laughter) because it takes hundreds of millions of years to get to the nearest life-bearing planet and back.

I'm sorry, Richard (Dawkins), but I've never done a biological field trip.

(Laughter) So, in fact, intergalactic space has all the prerequisites for unlimited knowledge creation.

Any cube anywhere in the universe can be a stage for our survival as well, if you have the know-how to spend it there.

We're not the only place to live

If you can create knowledge without limits in intergalactic space, you can do it in almost any environment, even on Earth.

Even on polluted earth

Resources are not the limiting factor anywhere, because they are plentiful, but knowledge, which is scarce.

Now, these ideas, based on our knowledge of the universe, probably -- I mean, they make us feel very special.

But it also makes us feel fragile, because we can't survive the challenges of space because we don't have the special knowledge to survive.

If a supernova explodes, even if it's light-years away, we're all dead!

Martin Reese, in his recent book, talks about our vulnerability to everything: space astronomy, scientific experiment debacles, and most importantly, terrorists' use of weapons of mass destruction.

He thinks civilization has a 50% chance of surviving by the end of the century.

I think he will speak later at this conference.

I don't think it's appropriate to bring up probabilities to discuss this issue, but I agree that there are only two possibilities: life or death.

But it's not about chance, it's about producing the right knowledge in time.

The threat of extinction was not without precedent.

Species are going extinct all the time

civilization will end

The vast majority of species and all civilizations that once existed are now a thing of the past.

If we want to be the exception, our only logical hope is to take advantage of the features that make our species and civilization different from all others -- namely, our ability to create new explanations and knowledge through our special relationship with the laws of physics, and become central to existence.

Let's apply this to today's controversy, not because I'm trying to endorse any particular solution, but because I want to illustrate what I mean.

Global warming is controversial

I'm a physicist, but I'm familiar with global warming-

I'm not a physicist. I'm a total amateur.

The rational behavior of a layman is to take prevailing scientific theories seriously.

And according to that theory, it's already too late to avoid a catastrophe. If the best course of action at the moment is to curb carbon dioxide emissions, as the Kyoto Protocol entails, it would be a catastrophe, even by any reasonable measure, because it would cripple economic activity and cost billions of dollars.

And the action that's gaining support doesn't solve the problem, it just slows it down a bit.

So it was already too late to avoid it, and by the time someone realized the danger, it was probably already too late.

It was probably too late in the 1970s, when the most valid scientific theory at the time predicted that the emissions would trigger a new ice age that would kill billions of people.

It's pretty clear to me what we're going to learn from this, and I don't understand why it wasn't discussed publicly.

we can't always know

When you know an impending disaster and you know how to fix it for less than the cost of the disaster itself, it's really not a big argument.

But no precautionary measure or precautionary principle is the solution to an as-yet-unforeseen problem.

Therefore, we need a problem-solving stance, not just problem avoidance.

The adage that prevention is better than cure is true, but only when we know what to avoid.

If you get punched in the nose, medical science doesn't tell you how to avoid getting punched.

(Laughter) If medicine were to stop researching cures and focus only on prevention, it wouldn't do much.

The world is now debating plans to forcefully cut greenhouse gas emissions at any cost.

We shouldn't just rave about plans to lower temperatures, but we should also consider plans to live in higher temperatures, and not at any cost, but efficiently and cheaply.

There are several such projects, such as placing lots of mirrors in space to deflect sunlight, and other projects, such as encouraging aquatic life to take up more carbon dioxide.

So far, these are sidestream studies, and they're not being looked at as solutions to this problem, or problems in general.

And our only hope is the ability to deal with as-yet-unknown problems rather than vaguely avoid them through sheer luck, and it's not just a hope for problem solving, it's a hope for survival.

Pick up two stones and engrave them

On one of the two, inscribe 'Problem is solvable'

And on the other, I'll engrave "The problem is unavoidable."

thank you

(applause)

it's getting terrible

The morals of frugality cultivated during the Great Depression and World War II forced us to leave.

That's because after the war, they shifted their enormous manufacturing capacity to normal-day production of goods.

Life magazine has joined the effort by introducing disposable products that free housewives from the painstaking task of washing dishes.

A note to liberators: Single-use plastics take up a lot of space and don't decompose naturally.

Only humans produce garbage that nature cannot digest

Plastic is difficult to recycle

A teacher gave me a way to describe less than 5% of the plastic that we recycle from our waste.

Koreppocchi Percentage

this is our recycling rate

First of all, this has a lot to do with the melting point.

Plastic doesn't get refined like glass or metal when it's remelted.

It begins to melt below the boiling point of water, absorbing oily contaminants like a sponge.

Half of the 45.3 billion kg of thermoplastic pellets produced each year instantly become waste.

A huge and unmanageable amount of garbage flows out of rivers into the sea.

This is garbage that has accumulated in Barona Creek next to the airport.

This is junk around California State University, Long Beach, and the desalination plant we visited yesterday.

Drink bottles make up the bulk of the trash that ends up in the ocean, even though you pay for the containers.

America uses two million bottles every five minutes, and TED presenter Chris Jordan does a great job of recreating the facts of mass consumption and magnifying the details.

This is a beached bottle island off the coast of Baja California.

Isla San Roque is an uninhabited bird colony off the coast of central Baja, which is dotted with human settlements.

Can you see that the container has a lid?

Plastic bottles sink in the ocean, so they don't flow out of the city to this point.

And the lid is made from a different kind of plastic called polypropylene, and it's manufactured in a different factory.

This material floats in seawater, but unfortunately it's not legally reusable.

Follow how millions of lids travel the ocean on their own

A year later, the cap that flows out of Japan goes straight across the Pacific Ocean.

Ten years from now, most of the Japanese lids will end up in what is known as the Pacific Garbage Patch, and the American lids will be scattered in the Philippines.

You can see that in 20 years, it will become a garbage accumulation zone of the North Pacific Gyre.

The millions of albatrosses that breed on the national monuments of Kure and Midway Atolls in the Northwestern Hawaiian Islands scavenge and scavenge to feed their chicks.

A dead 4-month-old Laysan Albatross found this in its stomach

Hundreds of thousands of dead goose-sized chicks with junk stuck in their stomachs, including lighters.

most are lids

Unfortunately, the parent birds mistook the flapping lids on the surface of the ocean for food.

Lid retainer rings also have an effect on aquatic animals.

This turtle is being cared for at home by Mae West New Orleans zookeeper.

I wanted to see what my hometown, Long Beach, was doing, so on Beach Cleanup Day in 2005, I went to the Long Beach peninsula at the eastern end of the beach.

I picked up trash all over this beach

If I offer 5 cents per lid

A lot of people accepted the invitation

Here are the 1,100 lids we collected

I expected to spend $20

went close to $60

I sorted them by color and used them for an Earth Day exhibit at the San Pedro Aquarium.

Governor Schwarzenegger and his wife Maria stopped by the exhibit

The governor and his wife shook hands, despite their "girly" crochet hats made of plastic bags, and I showed them the zooplankton trawl nets in the northern Hawaiian Gyre, where there is more plastic than plankton.

Here's a sample of the sea turned into plastic soup

If you pull a zooplankton trawl net 1 mile at sea level, you'll get something like this.

and this is

This is what garbage looks like washed up on a beach in Hawaii.

This is Kailua Beach, where the president's family vacationed before they moved to Washington.

Now, how do we analyze this sample, which contains more plastic than plankton?

Sorted plastic pieces by size from 5mm to 1/3mm

Tiny pieces of plastic are stubbornly sorbing organic contaminants, a million times larger than the surrounding seawater.

We wanted to see if the most abundant deep-sea fish at the bottom of the food chain were ingesting these pieces of plastic.

After hundreds of dissections, we found contaminated plastic fragments in the stomachs of over a third of the fish.

The record was 84 pieces in a small stomach of a fish that was only 6.3 cm long.

We can buy certified organic products

No hawker on the planet can source certified organic, wild-caught fish.

This is our legacy to future generations.

This throwaway society is unstoppable and has spread to the whole world.

Not all items can be stored or reused

Punishment cannot be avoided

Markets can do a lot, but they can't fix the natural systems of the ocean that they've already destroyed.

"Even the king's horse and all his men"

You can't recover the ocean by collecting all the garbage.

The situation is getting worse, the amount of packaging is increasing, the disposable concept in our lives is escalating, and it's showing up in the ocean as a result.

he has no hope of cleaning

No country can afford to keep plastic out of the ocean, and in the process, it could kill vast amounts of marine life.

The solution, says Moore, is to stop the plastic at the source, on land, before it reaches the ocean.

As long as the world of plastic packaging lasts, he doesn't hold out much hope.

Brian Rooney reports from California.

thank you

This is one of the two amazing photos I'm sharing with you today, taken 18 years ago.

I was 19 at the time

I just came back from my deepest class dive, 60+ meters, and I just came back from my deepest class, 60+ meters, and yes, I caught this little fish.

It was later revealed that it was the first fish ever caught alive.

I'm not just an ichthyologist, I'm a true fish idiot.

And for fish idiots, this is very exciting.

It turns out it was Jack Randall.

So I was really excited at this point

It also dictated the direction of the rest of my life, but the most significant and most meaningful thing about my life was

I was completely paralyzed from the neck down two days after this photo was taken. I made a really stupid mistake.

Like many young people, I was overconfident that I wouldn't die, and as a result, I was paralyzed by severe burial disease and was forced to return home for treatment.

I learned two very important things that day.

The first is that we all die, and yes, it's a very important lesson.

And second, it convinced me that this was exactly what I was going to do for the rest of my life.

We should focus all our energies on discovering new species that live deep within coral reefs.

Large, robust, complex corals, lots of bright, colorful fish, but this is just the tip of the iceberg.

If you look at this diagram of coral reefs,

Learn more about near sea level

Because it's easy for scuba divers to get close to it.

There is a limit to how deep you can dive

About 60 meters deep is the limit, and I'll explain why in a minute.

But divers generally stay shallower than 30 meters, and going deeper than that is very rare and insane.

To dive deeper, biologists turned to submersibles.

Submersibles are wonderful things, but if one of them costs you $30,000 a day, and you can dive 600 meters, you're going to have to go deeper and deeper without hanging around a few dozen meters.

It's been done well below 150 meters.

Now, in the middle, there are clearly defined zones above and below, and that's where I find the happiness I seek.

I want to know what's in this zone

we know almost nothing about

Divers can't go, submersibles go straight past.

It took me a year to walk again after my accident in Palau.

During that year, I spent a lot of time studying physics, diving physiology, and how to overcome the limitations of diving.

We're breathing right now, air is made up of oxygen and nitrogen.

About 20% of what enters the lungs is oxygen and about 80% is nitrogen.

Henry's law works

Gases exposed to water pressure dissolve in liquids in proportion to their respective partial pressures. Gases exposed to water pressure dissolve in liquids in proportion to their respective partial pressures. Basically, gases are taken up by the body.

Oxygen will be bound by metabolic processes and used for energy.

Nitrogen floats in the blood and tissues, which is normal due to human anatomy.

The problem arises when diving underwater

In fact, the deeper you dive, the higher the pressure.

When you dive to a depth of about 40 meters, the recommended limit for most divers, you begin to feel the effects of pressure.

The density of the gas molecules increases. Over time, the gas molecules dissolve in the blood and tissues.

start accumulating in the body

Then when you dive to a depth of 90 meters, the number of gas molecules entering your lungs increases not by five times, but by 10 times, and they're also dissolved in your blood, as well as in your tissues.

And of course, as you reach 15 times and dive deeper, the problem becomes even more acute.

The problem with air diving limits is all over the body -- it's like those dots. It's all nitrogen and oxygen. Scuba diving has three limits.

The first is oxygen --

In other words, it's oxygen poisoning. Now everyone knows this song, "Love is the same as oxygen."

If you inhale too much, you'll get too hot

If you don't have enough, you will die."

Diving can kill you if you inhale too much, because oxygen poisoning can cause seizures.

Convulsions in the water would be a problem

It's caused by too much oxygen in the body.

Nitrogen has two problems

The second is a phenomenon that Jacques Cousteau calls "deep-sea madness" --

It's nitrogen narcosis, which drives you crazy.

Strengthens as you dive deeper

Like drunk driving, diving while intoxicated is a big problem.

The third problem, of course, is the latent disease, which was a bitter experience in Palau.

The third problem, of course, was the latent disease, which was a bitter experience in Palau, but I forgot to mention that.

The way to prevent nitrogen sickness is to remove the nitrogen in your body, which is indicated by the blue dot, and replace it with helium. There are many reasons why helium is better.

It's a very small molecule and inert, so it doesn't cause nitrogen sickness.

The basic idea is that

But even though the principle is relatively simple,

it's hard to do

This is how I started about 15 years ago

It's not the smartest start, but I wanted to get a foothold.

I didn't know what I was doing at the time --

hardly anyone

I dived about 90 meters with this device

It's been improved little by little over time, and it turned out to be a really cool looking device, four tanks, five regulators, the right ratios of gas mixtures, etc. Four tanks, five regulators, the right ratios of gas mixtures, and so on.

We were able to dig deep and discover a new species.

Here's a picture of a new species of fish caught in about 90 meters of water, but the problem was lack of time.

Even with that much capacity and size

I could only stay for 15 minutes at most. I needed more time.

there had to be a better way

it is actually

In 1994, I had the good fortune to use a closed rebreather prototype.In 1994, I had the good fortune to use a closed rebreather prototype.

What's the difference from scuba and why is it better? What's the difference from scuba and why is it better?

Rebreather has 3 advantages

The first is to be quiet and make no noise.

Second, you can stay underwater longer, and third, you can dive deeper.

How is that possible?

To really understand that, let's take the cover off and see what's going on inside.

There are three basic devices in closed rebreathers, the most basic of which is the closed loop breathing device.

The exhaled air is also a closed loop

You inhale again and circulate again and again, so it's called a circulatory breathing machine.

There is also a counterlung (breathing sac), in this case there are two counterlungs.

Now, the counterlung isn't high tech, it's just a flexible bag.

thereby allowing mechanical inspiration and exhalation

Exhaled air is carried to the exhaust counterlung, and breath is drawn in from the inspiratory counterlung, which circulates the air through a circulatory breathing machine.

Other components of the closed loop breathing apparatus are

carbon dioxide adsorbent

We need to remove the carbon dioxide that is exhaled when we breathe out of the device.

There are chemical filters that remove carbon dioxide from exhaled breath.

This is the whole point of a closed loop breathing machine.

The main purpose of the gas system, the second component of the closed rebreather, is

Oxygen supply, that is, replenishment of oxygen consumed by the body.

The main tank of particular importance is this oxygen gas supply cylinder.

But with this alone, you're going to get oxygen poisoning very quickly and you won't go very deep.You'll get oxygen poisoning very quickly and you won't go very deep.

And it's called a diluent gas supply, right?

In our method, we usually put air in the diluent gas supply controller, because it's a cheap and easy source of nitrogen.

get nitrogen from it

But to go deeper, of course, we need other gases, and helium is that, and we usually use a larger cylinder like this on the outside of the rebreather.

And we usually use a larger cylinder like this on the outside of the rebreather.

When you start a deep dive, you inject gas from there.

The two oxygen cylinders are spares to keep you breathing if one of your oxygen supplies fails.

With a high-tech, advanced gas block located at the front within easy reach

It has all the valves and switches you need to control the gas injection It has all the valves and switches you need to control the gas injection

It's electronically controlled and you don't usually have to do it yourself, which is the third device. The most important part of the rebreather is the oxygen sensor.

Having three oxygen sensors allows us to identify malfunctions.

And that requires a majority voting circuit.

3 microprocessors

If you lose any two of them, you can still keep the whole system running, and there's even a backup power supply.

There are also multiple displays that show information

High-tech equipment like this allows you to do what you need to do when you're deep diving.

I could talk all day -- I'll leave that to my wife -- and I'd like to move on to something more interesting.

First of all, how do you dive?

Jumping into the water is the best way, jumping off the edge of the boat.

The reef where you dive is almost vertical and straight from near the surface.

So when you're in the water, it's like jumping off the edge of a cliff, and then you just keep falling.

Some people say, "It must take time," but it only takes a few minutes to reach the desired depth of about 100 meters.

But it only takes a few minutes to reach the desired depth of about 100 meters, which is kind of like slow skydiving.

It is very interesting

You saw Ed Harris fall along the wall in the movie Abyss, right?

It's wonderful like that

And the water is crystal clear because there's very little plankton, but when you look at the cave in the light.

All of a sudden, you're encountering a wide variety of creatures, far more than you could ever imagine, not all of them new.

Some species are known, like the white-striped fish.

But if you look carefully at the crevices, you'll see little creatures scurrying here and there.

incredibly diverse

More than just fish

These are crinoids, sponges, black corals, and there are more fish.

And the fish you just saw is a new species, and it's still a new species because it's submerged with a video camera instead of a net.

I'm still waiting there for you to come find me

But these habitats stretch for miles.

But these habitats stretch for miles.

This is Papua New Guinea

You can also see small fish and other non-invertebrate animals, such as sharks.

It's much more frequent than you might think.

I'm not sure why

But imagine everyone in 120 meters of water, carrying high-tech equipment on their backs, on a reef far off the coast of Papua New Guinea, thousands of kilometers from the nearest decompression chamber (where oxygen is administered), completely surrounded by sharks.

(Video) Look at that...

Oops!

It seems to be attracting attention (laughs)

Richard Pyle: When you talk like Donald Duck, you don't feel nervous. (Laughter)

The water is about 120 meters deep --

If you look straight up, you can see how deep you've gone.

If you're a biologist and you know sharks, you wonder how dangerous I am. Diver 2: It's Tsumadiro

Diver 1: Oh

Richard: There are actually three types of sharks.

The tip of the fin is white in the black-tailed shark

We also have gray reef sharks and hammerhead sharks in the distance.

(Video) Diver 2: Phew!

That little guy is so playful! (smile)

Now, you've probably seen a lot of these images on television, and they're all misleading as sharks are scary creatures.

Sharks aren't really that dangerous, so I didn't worry too much about it, and I was just kidding around.

In England people die from pigs and lightning strikes

more people die in soccer games

There are many other causes of death

it's not a hoax

Coconut too! more likely than sharks

So sharks aren't as dangerous as people say.

Well, I don't know if you have U.S. News & World Report, but I've got a recent issue.

It's about explorers, and the last article is titled "There's No New World."

Is there really no new world? [Discovery in science is like finding a guppy with extra spines on its dorsal fin] I wonder if there is still a true discovery [discovery in science is like finding a guppy with extra spines on its dorsal fin]

This is my favorite line in the article, [discovery in science is like finding a guppy with extra spines on its dorsal fin] laughs like a fish idiot because they don't call it that, and we're really excited to discover new guppy spines.

But there's more

So I'm going to show you some of the guppies I've discovered over the years.

You can see how ugly this fish is

Even if you ignore the scientific value of this fish, just consider the monetary value, and a few were eventually traded to Japanese aquariums.

For $15,000 each, so about 450 grams for $500,000.

This is also a new species of angelfish.

In fact, we first discovered this fish during the era of air diving.

It was when we were using air, we were in about 110 meters of water.

I remember coming back from a dive and it was like fog

The drunkenness lasted for a while and then gradually disappeared.

I saw a yellow fish with black spots and thought, "Oh my God, it must have been a new species that I should have caught." Finally, I looked into the bucket.

I totally forgot I caught one (Laughter), and I named it Nak Angelfish (Laughter).

The official scientific name associated with deep-sea habits The official scientific name associated with deep-sea habits And this is a well-proportioned fish.

At first, I didn't even know what family it belonged to, so I called it Dr. Seuss Fish, because it looked like something out of a Seuss book. Now, this is a very nice fish.

If you dive about 90 meters in Papua New Guinea

There is a small hill like this

It's hard to see, but it's a few meters in diameter.

If you look closely, you can see little white and gray fish that come and go. If you look closely, you can see little white and gray fish that come and go.

This white fish is building a mountain, one pebble at a time.

There are various discoveries, not only new species but also new behaviors and ecosystems.

And what I want to show you is

Here's a sample of some of the new species we've discovered.

What's amazing isn't just the number of discoveries. You'd be surprised at the number, but it's still only half the actual number. What's extraordinary is the pace of discovery.

7 different paces per hour

If you look in the trees in the Amazon jungle, you'll probably find a lot of insects, but when it comes to fish, there's no place where you can find seven new species in an hour.

A little rough estimate suggests that there are probably 2,000 to 2,500 new species in the Indo-Pacific alone.

There are only 5,000 to 6,000 known species, so a large percentage of species are still unknown.

I was just trying to understand the diversity of corals and fish.

So let me wrap this up with a damp look. At the beginning, I said I would show you two very special photos.

This is the second picture, and this is from when I was diving down there and photographing sharks.

It was taken 90 meters above my head, and what makes this photo special is

Because it captures the last moments of a person's life, and less than a minute after the photo was taken, the man was dead.

When I found the body, I understood what had happened.

He made a simple mistake, turned the wrong valve, and the oxygen level in the tank had doubled to 80 percent.

He drowned in a seizure caused by oxygen poisoning.

I didn't show you this to disappoint you.

Because I want to clarify my philosophy of life, which is that we all have a dual purpose.

The first goal, shared by all living things, is to survive with the rest of life on Earth, and this is called perpetuation.

because both of them perpetuate the genome.

And once you've fully understood the first goal, the second goal can be called spiritual achievement, financial success, or any number of other things. I call this pursuit of happiness the pursuit of pleasure.

I call this pursuit of happiness the pursuit of pleasure.

So from this theme, this man lived to the fullest So from this theme, this man lived to the fullest

We need a balance between these two goals.

Life is like a sexually transmitted disease with a 100% mortality rate

So don't live in fear

(Laughter) I think you know that.

(Applause) But at the same time, you don't want to ignore the first goal and focus on the second, because when you die, you can't enjoy anything else.

I wish you a bright and balanced future.

thank you

(applause)

I grew up in Seoul, but moved to New York City in 1999 for college.

I was a medical student at the time, and I wanted to be a surgeon.

Around the same time, I fell in love with New York

I began to realize that I could see the whole city of New York as a living organism.

I wanted to cut through the city and see the hidden layers.

The method was to use artistic means.

In the end, instead of becoming a doctor, I decided to pursue a master's degree in fine arts.

When I was in graduate school, I became interested in the creatures that lived in the corners of the city.

Rats are part of the lives of commuters in New York

Most people ignore or are scared of rats when they see them.

I live on the fringes of society - I fell in love with mice

Rats are used in experiments for human life, but they are also viewed as pests.

I started looking around New York and tried to take pictures.

One day, I was filming the subway tracks, and I was hoping that a mouse would come out, and a man came up to me and said, 'You can't film here.

The traffic department will confiscate the camera.”

I was pretty taken aback, so I decided to go after the rats.

I thought

And then I entered the tunnel, and there I saw a new side of this city, a sight that most people don't see.

Around the same time, I met people with similar interests who called themselves urban explorers, adventurers, cavers, guerrilla historians, and so on.

I was greeted by an Internet-based network that regularly explores urban ruins. They explore abandoned subway stations, tunnels, sewers, waterways, factories, hospitals, and shipyards.

When I took a picture of a place like this, I felt that the picture was missing something.

Simply documenting a building that was about to be demolished was unsatisfactory.

I wanted to create an underground fictional character or animal like this, and at the time, the easiest thing to do was to model myself.

I didn't want to wear Western clothes, because I wanted to create a composition that didn't include the elements of culture and era.

I wanted an easy way to represent the living bodies that exist in these decaying, neglected places.

This was taken at the Riviera Sugar Factory in Red Hook, Brooklyn.

Currently, it is an empty site of about 7,300 tsubo, and it will be a shopping mall in front of the new IKEA.

This is my favorite place, because it's the first time I've found a huge abandoned industrial building by myself.

When I first entered there, I was scared because the dogs were barking and I thought maybe there was a guard dog.

It was a stray dog ​​that lived there. It was by the water, swans and ducks were swimming, trees were everywhere, and bees were nesting in sugar barrels.

Nature was breathing back to the whole site

I wanted to integrate the human figure in the photograph with nature.

Once you get used to this place, it feels like a big playground.

I climbed tanks, jumped over exposed beams, and felt like a kid again.

This is a shot of the Croton Seaway, the first waterway that supplied New York City with fresh water.

Construction began in 1837

lasted about 5 years

It's been abandoned since the new Croton Channel was built in 1890.

When you enter a space like this, you're directly accessing the past, because it's been untouched for decades.

I love to feel the aura of a space with history

Instead of seeing a recreated building at home, you get to feel the bricks laid by hand, climb up and down tiny gaps, get wet and muddy, and walk down dark corridors with flashlights.

This is the tunnel under Riverside Park

Built in the 1930s by Robert Moses

This mural was painted by a graffiti artist to remember the hundreds of homeless people who were displaced when the tunnel reopened in 1991.

It's quiet inside this tunnel and it's very calming

There's no one around, you can hear the children playing in the park above you, and you're completely oblivious to the existence of what's below.

When I used to go to places like this, I felt a lot of anxiety and loneliness. I was in a lonely period in my life.

"Naked City" is another name for New York, and "Melancholy" describes a feeling of alienation from the urban environment—a state of depression and helplessness.

this is the same tunnel

You can see the train approaching with the sun shining through the vents.

This is a disused tunnel in Hell's Kitchen.

I was alone preparing to shoot when a homeless man approached me.

I invaded his living space

I was terrified at first, but when I calmed down and explained my plan to him, he seemed fine, so I set the camera on the self-timer and shot back and forth.

When the shoot was over, he handed me his shirt, said he could wipe his feet, and kindly sent me off.

A customer like me will never come

(Laughter) And since that happened, I've been obsessed with something.

The homeless man represented to me the unconscious element of the city.

He was violent on the surface and was once in prison, but he finally found peace in this tunnel.

Tunnels were once built for the city's prosperity, but are now shelters for the outcasts, who are completely forgotten from the everyday life of the average urban dweller.

This is under my alma mater Columbia University

This tunnel is famous for being used during the development of the Manhattan Project.

What's interesting about this tunnel is that you can see the original foundations of the psychiatric hospital that went on to build Columbia University and was demolished in 1890.

This is the New York City Farm Colony, an almshouse on Staten Island from the 1890s to the 1930s.

Most of my photographs are of places that have been neglected for decades, but this one is an exception.

This children's hospital closed in 1997. It was a hospital in Newark.

When I went there three years ago, the windows were broken and the walls were peeling off, but everything was still there.

You can see the dissecting table, the mortuary tray, the X-ray machine, and even the used surgical instruments on the dissecting table.

After exploring the recently disused buildings, I realized that anything can quickly become abandoned: a house, a company, a shopping mall, a church, any man-made building around you...

It made me realize how fragile our sense of security can be and how vulnerable and vulnerable people can be.

I love to travel and Berlin is one of my favorite cities.

It's a historic city, full of wartime bunkers and ruins.

This was taken at a homeless shelter built in 1885 that can accommodate 1,100 people.

When I was on the train, I saw this building, and at the next station, I got off, and the people there let me into a catacomb-like underground space, which was used as an ammunition depot during the war, and at one point, a refuge for Jewish refugees.

This is the Catacombs of Paris

There, I explored a lot of off-limits places and fell in love at first sight.

The tunnel is about 300km long, but only about 1.6km is open to the public as a museum.

The first underground passages date back to 60 BC

It had been used as a limestone quarry for a long time, but by the 18th century it was pointed out that the cave-ins were dangerous, so the government ordered the existing quarries strengthened and dug new patrol corridors to monitor and map the whole area.

As you can see, this system is very complex and vast.

It is very dangerous if you get lost in this place.

At the same time, the city had a problem with too many cemeteries.

Ashes were moved from the cemetery to the quarry and turned into catacombs.

More than six million human bones are housed here, some more than 1,300 years old.

This was taken under Montparnasse Cemetery, and most of the urns are here.

There are many telephone wires used in the 1950s and WWII-era bunkers.

This is a German army bunker

Nearby is a French bunker.The whole passage system is so complex that the Germans and the French never met.

This passageway was famously used by the Resistance and is mentioned by Victor Hugo in Les Misérables.

I saw a lot of graffiti like this from the 1800s.

After exploring the underground of Paris, I decided to climb somewhere else, and I climbed a Gothic monument in the middle of Paris.

This is the Tower of Saint-Jacques

Built in the early 1500s

Sitting naked on a gargoyle in mid-January is not recommended

It wasn't very pleasant, and I hadn't seen a mouse in a place like this until recently, until I went to the sewers in London.

This is probably the hardest place to explore

It was full of toxic fumes, so except when I took this picture, I had to wear a gas mask.

As the waste wave rolls in, it feels like a storm is approaching.

This is a still from a movie I recently made called "The Blind Door"

I became more interested in capturing movement and texture.

16mm black and white film creates a different feel

This is the first theater project I worked on

Adapted from August Strindberg's "Dreamplay"

And he played a one-off performance in Brooklyn's Atlantic Avenue Tunnel, which was built in 1844 and is considered the oldest subway tunnel in the world.

Recently, we've started doing joint projects like this.

But whenever I get the chance, I always work on my own series.

The last place I visited was the Mayan ruins of Copan in Honduras.

This was taken in the archaeological corridor inside the main hall.

I like to do more than just explore

I feel obligated to bring these spaces to life and humanize them in creative ways to preserve memories before they are lost forever.

thank you

Four years ago, I presented here at TED about a company I was working on at the time called Odeo.

And with that announcement, a big article was published in the New York Times, and it got more media and a lot of attention, so I decided to take on the CEO of that company. After all, I was just a consultant. After raising venture capital, the company began hiring more employees.

Among them was an engineer named Jack Dorsey. A year later, when I was trying to figure out where Odeo was headed, Jack showed me an idea he'd been toying with for years, and it was basically a quick update on what's going on with his friends.

Odeo was working on SMS at the time, so we combined them and started Twitter as a side project of Odeo in early 2006.

It's hard to justify doing a side project at a time when focus is extremely important for a startup, but I had the experience of actually launching Blogger as a side project at my previous company, and at first I thought it was just a side job, but before I knew it, it had taken up not only the company, but the rest of my life for the next 5-6 years.

Since then, I've come to value my intuition even if it's not always justified or I don't know what direction it's going to take.

This has happened many times on Twitter.

For those of you who don't know, Twitter is based on a very simple and seemingly boring idea.

Say what you're doing in 140 characters or less, and people around you who care about you will get the message.

If you're really interested, you can even receive it as a text message on your cell phone.

For example, you can say on Twitter that you're giving a talk at TED.

In my case, if I hit "post," 60,000 people would instantly receive the message.

The basic idea of ​​Twitter is to allow people to share the moments of their lives. Whenever you want it, whether it's a big event or something very mundane. (smile)

By sharing the moments that happen every day like this, people can connect in real time even when they are far apart, and feel a stronger connection.

That's what I originally thought about how to use Twitter, and what got me hooked.

What we didn't anticipate was the many different uses that could emerge from this very simple system.

One thing we've noticed is that Twitter is extremely useful for real-time events.

In October 2007, when wildfires broke out in San Diego, people turned to Twitter to report what was happening and to get information from their neighbors about what was happening.

Moreover, not only individuals

The Los Angeles Times actually shared the information on Twitter. I put a Twitter feed on the front page of my website. The Los Angeles Fire Department and Red Cross also shared information on Twitter.

In this event, a lot of people posted information on Twitter, and a lot of people got their updates to know what was really going on and what it felt like to be there.

Another interesting thing that happened was business. In addition to the obvious use cases such as marketing and communication, the popular Korean barbecue taco truck in Los Angeles posted its stop location on Twitter, and a long line formed around it.

Politicians have also recently started using Twitter.

In fact, 47 members of Congress now have Twitter accounts.

Moreover, in one case, they used Twitter behind the scenes of secret meetings with the president.

This person doesn't seem to like what they're hearing.

The President himself is our most famous Twitter user, but while he's been posting less frequently lately, Senator McCain seems to be updating more frequently.

And this guy (Chris Anderson).

Twitter was originally designed to be more like a broadcast medium. The message you send is transmitted to people, and you receive information that interests you.

One example of how users have driven Twitter to evolve is by creating ways to reply to specific people and messages.

Here, the "@username" syntax used by Shaquille O'Neal in replying to a fan was entirely invented by users, and only improved the system to make it easier to use after the feature became widely used.

This is one of many examples of users directing Twitter.

Another option is to use the API.

By adding an API to Twitter, programmers can develop software that interacts with Twitter.

Currently, we know that over 2000 software can send Twitter updates. There are software for Mac, Windows, Linux, iPhone and BlackBerry, as well as a device that notifies you via Twitter when your baby kicks in the womb, and another that notifies you when to water a potted plant via Twitter.

Perhaps the most important third-party development comes from a small Virginia company called Summize.

Summize has created a search engine for Twitter.

They realized that if large numbers of people around the world were talking to each other about what they were doing and what was going on, it could be a great tool for discovering current events and topics.

This has changed our perception of Twitter significantly.

For example, I can see what people are saying about TED right now.

This was another feature that changed our mindset a lot, and Twitter wasn't what we thought it was.

We liked the search engine so much that we actually bought the company and incorporated it into the main body of the service.

Not only will this give you a different perspective on Twitter, but it will also open up new uses for it.

One of my favorite events was the gas shortage in Atlanta a few months ago.

When a user found gas, they updated it on Twitter with where it was and how much it was, with the keyword "#atlgas" at the end so that other people could find the message and get gas.

The trend of people helping each other using this communication network is a departure from the original idea of ​​keeping up with family and friends.

This phenomenon is happening more and more these days, from raising money for homeless people, to digging wells in Africa, to helping families in crisis.

People have successfully raised tens of thousands of dollars on Twitter, often in just a few days.

It seems that giving people an easy way to share information can do a lot of good.

I have no idea what will happen next on Twitter.

I decided to follow my intuition, but I had no idea where it was going.

thank you very much.

(Applause) Chris Anderson: Actually, we're not done yet.

Make this screen look live...

In fact, this is also the act that speakers fear most after attending an event.

The whole thing is terrifying.

This is the Twitter search screen

Type in some suitable words.

For example, "Evan Williams..."

“…to give people more information and follow their gut #TED”

"I'm listening to Evan Williams right now."

"...Evan Williams dying on stage at TED.

The worst lecture ever! (laughs) Evan Williams: Good. thank you.

Chris Anderson: Just kidding.

But really, there were already about 50 posts about the talk during the eight minutes he was speaking.

So you can see reactions from different perspectives. For the fact that Barack Obama is the biggest user, and the fact that it came out of TED,

There is no other way to get instant feedback like this.

You've created something very attractive, but there's still more interesting things to come.

Thank you Evan.

It was very interesting.

In 1992, I started working for a private research company in Silicon Valley called Interval Research, founded by David Liddell and Paul Allen.

I talked with David about what we should do at the company.

At that time, I had retired from the virtual reality business of 20 years and made a living by writing books and giving lectures. My "game for girls" idea wasn't even looked at.

A discussion with David revealed that we had the same question. The question is, "Why aren't there video games for girls?"

Why?

It's not that there is a trend of disdain for women in the game industry,

Nor do they care.

They had $6 billion on the table and

If you can figure out how to steal it, they are the people who go to steal it.

So what was the problem?

And how do we make it happen? Interval Research is a company with humanism and a people-oriented attitude. We are a company that is always looking for that path.

The foundation of "humanism" is that doing good deeds is pleasurable, that there are things worth doing that can improve the quality of life. And unbiased survey results tell us how.

Contrary to what many people believe, research results do not contradict the realities of everyday life.

Interval Research embodies that truth.

Through the best research we could gather, David and I explored what it takes to get girls interested in computers and to achieve the clarity and fun of controls that make boys so into video games.

The research took two and a half years. Then I spent another year and a half doing basic research.

And I created a subsidiary for this project.

In the research phase, we partnered with Cheskin Research. Mr. Davis Mastin and Mr. Christopher Ireland of Cheskin Corporation introduced me to a completely different concept of 'market research' than I originally thought.

They taught me how to observe. The way they did it, the questions were very well thought out, and they didn't ask pre-determined options and ask silly questions like "Which one do you like best" that yielded no useful answer.

We did four surveys during the two and a half years of our initial research. First, we looked at a wide variety of literature on spatial cognition, gender studies, play theory, sociology, primatology, and related areas of cognitive psychology.

I would like to express my heartfelt gratitude to Dr. Frans de Barr for his great cooperation in this research.

After extensive literature research, they found striking features in gender differences and playstyle differences. In fact, it was quite so. We then moved on to the second stage of research, interviewing experts. Experts are authors of relevant literature and people who interact directly with children on a daily basis.

We focused on people, such as playground supervisors. I made some hypotheses about play and gender differences, and based on those hypotheses, I asked questions.

Then, at the crux of the study, I interviewed 1,100 boys and girls ages 7 to 12 across the United States. However, children in Silicon Valley, Boston, and Austin, whose home environment seems to have a special familiarity with computers, were excluded.

Over the course of two years, we ended up interviewing 10,000 children and their friends across the United States. We spent another year designing and improving computer products for little girls ages 8 to 12.

In the process, we improved our interactive prototypes by letting little girls try them out.

In November 1996, he established a subsidiary of Interval Research called Purple Moon. Purple Moon's principal investors were companies such as Vulcan Northwest, Institutional Venture Partners, and Allen & Company.

On September 2nd, we launched our first website. The website currently has 25 million pages and 42,000 girls registered as users.

Accessed 1.5 times a day on average. They spend an average of 35 minutes per visit and browse 50 pages.

We consider ourselves successful in creating an online community of girls.

In October we launched two sites. An eighth grade character called Rocket spends his first day at a new school with a blank notebook. Players play by answering questions such as "What do you want to be like in the future?"

"What would high school and junior high school be like?"

Questions like "Are you my friend?" These questions are designed to make you experience love in a complex society, and to make you realize that you have many choices in how you live and how you behave, depending on your answers.

Another site we launched is "Forest Hidden Paths". This was a title that appealed more to the inner fantasy part of the player.

These two game sites ranked within the top 50 in the game software ranking by PC data. In December, it was positioned right next to the popular software John Madden Football.

So we were really able to impress hundreds of thousands of little girls.

About the impression of the Purple Moon brand So far, we have obtained about 500 million impression survey results.

About 96 percent were supportive of us and only 4 percent were unfavorable.

Now I would like to talk about the 4% of people who did not support it. Because this collective insight was, in some ways, the most important thing to us.

There were two types of people who gave negative reviews.

One was male game geeks, and they had an idea of ​​what games should be like, and they thought girls didn't play games.

The other group was a kind of feminist who thought they knew what it was like to be a little girl.

It was very interesting to me that these two very different groups have something in common. They don't really listen to the little girl.

They don't see their children. And he showed no affection for his children.

Now, we would like to hear what the girls have to say about our two and a half years of research. Some are very recent.

The interview will be introduced along with the photos they took. They don't show themselves in the picture, but they tell us what they like and what they hold dear.

They were photographed by their self-confidence. These are the things you can only get by listening to their voices, and the joy of doing human work, and that's why I recommend this kind of research.

Yes, my character is usually a tomboy.

She is interested in boys.

Oh yeah.

The first thing you do when you play the game is, each of you takes a piece of paper and writes down your name, age, rich, rich, average or poor, do you have a boyfriend, dog or pet, um, do you have a brother, etc.

You may be divorced. Maybe you are divorced.

this is mine

We make a school newspaper online.

If it's a girl's game, it should have cute scenery with clouds and flowers.

For example, if you're really adventurous and very tomboyish, you might find girl games effeminate.

I love running track, playing soccer and basketball.

Sometimes you can't really enjoy it unless it's like a vacation. Feeling like when the holidays go on and on

Yeah, I have music lessons and I'm on the swim team, so I have a lot of work to do. I get so bored sometimes because I have to do it all.

My friend Justin took my friend Kelly and they are both mean to me.

I get annoyed sometimes when I have a brother. Because I imitate and take what I came up with and do it first.

My sister is older than me, so I take it all. When I ask my mother for something, she always says "no"

I will forgive my sister anything.

Here's a little, really short, show of "Rocket's Tricky Judgment," which entered its final stages two days ago.

I wish the video was stable.

This is the second day of Rocket's life.

And the reason I'm showing you this is because I hope the scene I'm about to show you is familiar and familiar to those of you who have heard some girl voices.

So you can see how we incorporated the findings of our research into the game we created.

Maiko: Hey Rocket! Come here!

Rocket: What's wrong, Maiko?

Maiko: Did you hear about Nakiria's big Halloween party this weekend?

she asked you to check

Nakiria invited Reuben, but Rocket: But what? isn't he coming?

Maiko: I don't think he will come.

I heard his band is playing at another party on the same night.

Rocket: Really? which party?

Girl behind: Max's party is the best.

The one that invites the best people.

We don't have much time, so we fast-forward to the main selection point of the game.

After this party incident, Rocket decides what to think about this.

Rocket: I wonder who will come to the party.

I could go to Max's party whenever I wanted.

I doubt if I'll be on Max's best friends list.

It's getting more and more negative

When playing this game, about characters

It makes me want to know more. In that case, you can examine it in a hidden passageway. Let me show you the scene.

For example, we can see Maiko's locker and get information about Maiko.

Oops, I went the wrong way

I hope this gives you a general idea of ​​what the game is about.

We wanted to take what we learned from the girls through our research and show them how we incorporated into the game what they want, to experience emotional flexibility and live in a complex social life.

What I'm trying to say is, this is how we show girls that there are many choices in life, and that people are watching them.

That's what I wanted to tell you.

we love them

and looking at them.

We are not trying to tell them what kind of person they should be,

I am happy with them as they are.

That leads to the fact that they are wonderful.

At the end of this performance, I would like to show you the future version of the Rocket series. Created by our graphic artists and designers with the 4% negative opinion.

“Rocket 28”

Rocket: I think I just woke up...

thx.

One day, when I was walking with my wife in the market, someone put out a cage in front of me.

Through the cracks in the basket, I could see an orangutan with very sad eyes.

was a baby It was the first time I met an orangutan.

That night, when I returned to the darkened market, I heard a voice saying, "Woo, woo!" Just as I expected, I found a baby orangutan abandoned in a garbage pile.

Of course I took the gauge home and

I took him out, gave him a massage, gave him water, and he was finally able to breathe normally.

This is Uce

She now lives in the Sungai Wain jungle. And here is her son, Matahari. Matahari is also the second son of Dodoy that I helped.

This event changed my life. And now there are 1000 babies in my two facilities.

(Applause) No. home. It is different!

It's tragic. It's proof that they can't protect them living in the wild.

It's very sad.

It is proof that we are acting selfishly.

There are more orangutans in the wild than there are in zoos around the world, and even now, six have vanished from the forest like baby victims.

deforestation. Oil palm cultivation for biofuel, especially for the West, poses a problem.

The original bog forest sits on a peat bed as high as 20m, making it the largest deposit of organic matter in the world.

Developing this area for oil palm cultivation would create a CO2 volcano, resulting in a large amount of CO2 emissions. Thanks to this, Indonesia has become the third largest greenhouse gas emitter after China and the United States.

without any large-scale industry. All because of deforestation.

If you look at the tragic situation, I think you'll understand.

I don't want to talk too much about this, but many of Uce's families can only live in the forest and have to survive in dire conditions.

I didn't know where to send them anymore.

So I decided to find a solution for her too. Solutions must also benefit those who have cut down forests. Cutting down trees destroys habitats and increases casualties.

So I created a place called Samboja Lestari. As for the idea, I thought that if I could succeed in the worst place where nothing was left, no one would be able to say "Yeah, but..." as an excuse.

There is something we can all do.

Eastern Borneo, that's where the project started.

As you can see, there are only yellow lands.

There is nothing left, just a little bit of grass.

In 2002, about half of the people living here were unemployed.

Crime was also rampant.

Residents spent most of their living expenses on medical expenses and drinking water.

There was no agricultural productivity left.

In the poorest areas of the state, the wildlife was completely wiped out.

It was truly a desert where life had died out.

It was so hot that when I stood there, all I could hear was grass being blown by the wind, not the chirping of insects.

However, four years later, we have reached the point where we are providing jobs to 3,000 residents.

Even the climate has changed. I'll show you. no floods, no fires,

It is no longer the poorest area. It also restored biodiversity.

1,000 kinds of creatures live here, and currently 137 kinds of birds,

There are 30 species of reptiles.

What happened? Humans were making an economic mistake in this forest.

Basically, the deforestation process was occurring at a slower pace than the oil depletion process.

But the end result is the same.

Are you familiar with slash-and-burn farming? People who can't afford pesticides burned the trees and half of the accumulated minerals. Forest fires will increase, and after a while you will be left with only barren land, and you will be at a loss.

One tree is gone.

But on this grassy hill we built our first office, and four years later there was a new green area on the planet.

(Applause) There, the animals and the inhabitants live happily together. It also has its own economic power.

Well how?

Step by step, it's not that difficult. We bought land, dealt with forest fires, and then started greening, combining agriculture and forestry.

And we set up infrastructure, management methods, and economic support.

At no stage did the involvement of the local people disappear. By doing so, it is possible to prevent resistance from the outside,

Residents became the protectors of the forest.

Taking the principle of “People, Profit, Planet” and adding to it is the legal status. Because if the forest belongs to the state, people will say that it belongs to them and that it belongs to everyone.

And other principles were also applied. For example, the transparency of planning and the results of professional management calculations. scalability and so on.

We created a recipe for creating a state of purpose from nothing.

Recipe creation begins with the elements you can control. Technology, pesticides, plant choice, etc.

Note the output from it and record what you get.

And this recipe also includes a cost.

Also consider the amount of labor required.

If you were to draw this recipe on a map, you would need a recipe suitable for sand, clay slopes, plains, etc. By mixing them together, you get a business plan or a work plan. The key to success is the workforce you have and planning with pesticides in mind.

This is the actual effect. First weeds from the root

Remove.

Acacia may seem insignificant at first glance, but it is necessary to maintain local weather, protect soils, and improve grasslands.

After 8 years, it can be used as wood. If properly stored, it can be used as a building material along with bamboo skin.

It is used in ancient Japanese temple construction techniques, but bamboo is very vulnerable to fire.

If I had planted it early, there was a high chance that I would lose everything again.

So later I planted it at the water's edge. It filters water and provides materials when wood is available.

The point is how to fuse the changing process with limited means in a fixed space.

I planted trees and planted pineapples. Ginger and beans were grown in the middle to reduce the survival competition of the trees. The organic pesticides used are friendly to agricultural products and people, and help trees grow. The residents had land at their disposal, an early source of income, and the orangutans had a healthy diet. We also succeeded in hastening the regeneration process of the ecosystem. while saving money at the same time.

Great theory!

But it's not easy.

Just look at what happened in 1998 and you'll see. A fire broke out.

This is about 50 million hectares of land.

January

February

March

April

May

We lost 5.5 million hectares of land in just a few months.

Because there were 10,000 underground fires. It's happening here in Pennsylvania, too.

When the soil dries up and the dry season begins, the ground cracks. Oxygen enters and causes fire. It goes back to the beginning.

How do we break this cycle?

Fire is the worst problem.

It was in this state for 3 months.

For 3 months, the auto-on light never went out. It was so dark.

I lost all my produce, my kids didn't gain weight for over a year, their IQ levels dropped, and it was the worst. Orangutans and residents alike.

Dealing with fires is of paramount importance.

That's why I put it here as a key point.

The cooperation of local residents is also important. Once they start burning the grasslands, it spreads like the wind, and the ash and nutrients left behind are washed out to sea by the rains and lost. In the ocean, it can also destroy coral reefs.

Cooperation with local residents is essential.

Besides these short-term solutions, long-term solutions are also needed.

So we planted sugar palms in a circle around the area.

Sugar palms are fire resistant, prevent flooding, and generate income for residents.

Make a small incision in such a plant and extract the sap twice a day. Carbon dioxide, rain, and a little sunshine will give you sugar water.

The principle is to turn these trees into photovoltaic cells for plants.

You get a lot of energy. It provides three times as much energy per hectare per year. Because the sap can be collected every day.

No other plants or produce need to be harvested.

This is the result of a successful combination of tropical, ecological potential and technology.

but. Proper legal procedures are also necessary for success.

So we bought the land and started the project there. From nothing at all.

If you zoom in a little more, you can see that the whole area is categorized by soil type. And we're spending our money measuring every tree on our 2,000 hectares (5,000 acres).

This forest is special.

I just obeyed the laws of nature. "Monoculture" does not exist in the laws of nature, and "diversity" is essential.

Both in and on the ground. It works to its full potential by making better use of sunlight and increasing carbon dioxide storage.

However, it is very complicated, and cooperation with residents is important here as well.

Therefore, we planted fast-growing trees just like in the natural world, and at their roots we planted slow-growing tropical trees that make effective use of sunlight. And don't forget to let the right fungi live together. When the leaves of the tree die and fall off, the fungi help break them down and return nutrients to the roots again within 24 hours of the leaves falling off.

These eventually become nutrient pumps.

Nitrogen fixation requires bacteria, and without them there would be no effect.

After that, we started planting 1,000 trees a day.

We could have planted more trees, but we avoided it. Because I wanted to keep long-term stable work.

They didn't want to lose the people who would work here.

I tried very hard.

Indicator plants were used to distinguish soil types. I tried to find out which vegetables and trees grow.

I checked each tree from space.

It's actually like this. A 100 meter wide land surrounded by sugar palms in a circle provides income for 648 households.

small in this area

We have a unique nursery.

For example, let's compare it with the types of trees that live in Europe. From the Urals to England, how much do you think it is?

It's 165.

This nursery grows 10 times as many seeds.

Surprise?

It is important to know the plants you handle well, but the "diversity" of the natural world is the key to success.

To improve from zero, grow vegetables, plant trees where grasslands used to be, create buffer zones, produce compost, and ensure agricultural production at any stage of reforestation.

First, pineapples, beans and corn. Then bananas and papaya. Then cacao and chili.

Over time, the trees will grow thicker, and you will be able to obtain agricultural products such as fruits, lumber, and firewood.

Finally, the sugar palm grows and becomes a permanent source of income.

The white spots in the upper left, below the green stripe, are individual pineapple stumps, visible from space.

We also grew acacia trees in this area. I just showed you.

Here's what it looks like a year later.

And two years later.

This is a view from the top of the tower. At this time, I started removing weeds.

Seedlings of agricultural products for local residents such as bananas and papaya are planted, and the trees grow larger and larger in the open spaces.

Three years later, it will be home to 137 species of birds.

(Applause) And it also helped to lower the temperature by 3-5 degrees Celsius.

Humidity increases by 10%,

I will show you later, but the amount of clouds increased,

Precipitation has increased.

Everything comes down to your source of income.

The ecolodge I built here, three years ago, was in the brown wasteland.

Operating in conjunction with the European Space Agency, the transponder will process and image information from all satellites passing overhead.

Based on the images, we analyze the amount of carbon dioxide and the progress of forest regeneration. Using this satellite image, it is also possible to observe all the trees.

We are now able to provide this data, along with reforestation methods and techniques, to other communities.

Already used in Google Earth.

With technology that processes data changes and Google Earth, we can see which palm oil was produced in an environmentally friendly way and which companies are cutting down trees. Rainforests are the largest reservoirs of carbon dioxide on earth.

This is the Samboja region.

You can see that the forest is regenerating, but you can also see that the diversity of the ecosystem is reviving.

Their diversity tells us how much water or medicinal herbs they hold.

And I made a natural rain machine. The forest itself is making it rain.

The nearby town of Balikpapan was plagued with water. Eighty percent of the island is surrounded by seawater, and erosion has increased.

Let's take a look at the clouds in the sky above this forest.There are reforest areas, semi-open areas, and open areas.

Look at this image.

It will flow quickly, but

In the tropics, raindrops are not formed from ice crystals as they are in the temperate zone, but from substances released from the leaves of trees.

You need a cool place for clouds to accumulate and trees to make it rain.

And look. After three years, clouds increased by 11.2%.

Focusing on rainfall, it has already increased by 20% in the third year,

It continues to grow in the following years.

Precipitation increases in a small area at first, then the area widens and rainfall increases,

As for the rainfall, it used to be the driest over Samboja Lestari. However, it is now the area with the highest rainfall.

We can actually change the weather.

Of course, the effects of the trade winds wear off, but once the winds settle, rain waves reappear over the region.

It would be wrong to say "I'm hopeless". You can actually break the status quo. By combining all techniques.

Science is also important, but most of it is due to the cooperation of the residents, their own efforts and education.

We also established an agricultural school.

The band's greatest success has to be this band. When a baby is born, everyone welcomes it with a performance. After all, family is the most important thing.

Now, if you look at this

You have a road. This has enabled us to supply electricity and water to our residents.

There is also a sugar palm cultivation area, and I made a fence with spiny palms. This is to keep the orangutan's habitat central and isolated from human space.

Within the fence, there is a reforestation area, which acts as a gene bank to hold the breeding of organisms. Not a single tropical hardwood has grown in the last 12 years. This was also due to climate change.

All the seeds are eaten.

Therefore, we conduct thorough internal monitoring. From towers, from sanitary and from gliders.

Those who gave up their land once regained their land,

I also made a fence of tropical trees. In the first year, shade trees are planted, then sugar palms are planted and thorn fences are built.

After a few years, the shade trees will be ready for harvest,

Acacia wood and preserved bamboo are used to build houses and fuel fires.

Thanks to this wood, many things are possible,

It also provides income for three families.

Residents' support is important for this program. In other words, it must be suitable for the region and culture.

We need recipes adapted to each land.

must be scrupulously.

In the case of Samboja Lestari, one parcel of land was divided among 20 families.

If one person breaks a promise and cuts down a tree, the other 19 families will consider what to do with that person.

If a group doesn't do anything, consider disposing of the group whose plans are disrupted by the other 33 groups.

In a cooperative, democratic culture, it's good to plan according to local morals.

In summary, in the first year, residents sell their land and earn income. Then get them into construction jobs, reforestation jobs, caring for orangutans, and making wood crafts.

The land between the planted trees will be returned to the residents free of charge so that they can grow crops.

A portion of the grown fruit will be purchased by the Orangutan Rescue Program.

You can get building materials, and you can make a contract to sell sugar palms. As a result, it becomes possible to produce fuel locally.

It's a great plan to get benefits such as money and education while improving the environment.

All based on one idea. to protect the forest.

If you want to help the orangutans, which is what I did, it's important to come up with a plan that benefits the local people.

It's simple, but the number one key point is "harmony".

Read more if you want to know more.

(applause)

As an actor, I'm given a script, and my job is to act according to the script, say my lines, and represent the characters that someone else has created.

Throughout my career, I've had the great honor of playing one of the greatest male role models ever represented on the television stage.

You may remember my role in "Prostitute Part 1"

(Laughter) "Photographer date raping." "Shirtless man date raping" from Spring Break Shark Attack.

(Laughter) "Shirtless med student," "Shirtless muscle idiot cheater," and then Raphael, who's the signature role.

(Applause) He's a playboy who has a change of heart, a sullen playboy who falls in love with a virgin woman, and rarely even takes his clothes off.

(Laughter) These roles don't represent who I am in real life, and that's why I love acting.

You can live a role that is very different from yourself

But every time I play a role like this, I'm surprised, because a lot of them have machoism, charisma, and power, and they're so different from who I see in the mirror.

But Hollywood seems to see me that way, and eventually, as a man, I began to see similarities between the roles I played on-screen and off-screen.

All my life I've been playing someone who wasn't who I really am.

I pretended to be strong when I was feeling weak, pretended to be confident when I was insecure, and pretended to be tough when I was deeply hurt.

It's like I've been acting for most of my life, but I'm tired of acting.

Let me tell you now that it's hard for anyone to be a man all the time.

Well- right?

(Laughter) My brother seems to agree.

For as long as I can remember, I've been told what kind of man I should be when I grow up.

When I was a boy, all I wanted was to be recognized and liked by other boys.To gain their approval, I had to shun femininity.I was taught that femininity is the opposite of masculinity.So I had to choose between refusing to embody femininity or being rejected.

we are given this script

right? Women are weak and men are strong

This message has been planted in the subconscious minds of tens of millions of boys and girls around the world, and so have I.

Well, today I'm here as a man to say that this message is false, it's harmful, and it's time to end it.

(Applause) But I'm not teaching history classes.

You all know how we got here

I'm a man who has lived 30 years and finds himself in a conflict, a conflict between who he is and what the world thinks men are supposed to be.

I don't want to embody the already broken definition of masculinity. Just being a good man isn't enough.

i want to be a good person

The only way this can happen is if men don't just embrace the qualities they've been taught to be feminine, but they stand up to celebrate and learn from women who have those qualities.

Now, men -- (Laughter) I'm not saying that everything we've been taught is harmful.

It's not that we men are inherently wrong, and I'm not telling you to stop being men.

But you need balance, right?

There has to be a balance, and the only way things can change is to take a long, hard look at the scripts that have been handed down to us for generations and the roles we have accepted as men in our daily lives.

Speaking of scripts, my first script was given to me by my father.

dad is the best

Loving, kind, sensitive, nurturing, and here today.

(Applause) I'm crying.

(Laughter) I'm sorry, Dad. When I was a kid, I hated that.

Bullied for being calm

My father wasn't what you would call a manly man, he wasn't taught how to use his hands.

We weren't taught the so-called masculine things like hunting and fighting.

Instead, my father taught me that being a man is about making sacrifices, about doing the best you can to support your family.

There's another role that my father taught me, and one that my father also learned from him. My grandfather was a member of parliament, but in his later years, he took a night job as a janitor to support his family. Don't tell anyone.

It is a role that suffers without anyone knowing

Three generations later, I'm playing that role too.

Why couldn't he ask someone else for help?

Why does my father still feel like he has to do everything himself?

I know a man who would rather die than tell someone he's hurt.

It's not because they're all strong and quiet.

No, many men are very good at talking openly, they just don't speak up.

(Laughter) If it's about work, sports, politics, women, it's okay to exchange ideas.

at least i am

The way I practice to free myself from this kind of behavior is to willingly put myself in a vulnerable position.

If there's something in my life that makes me feel ashamed, I jump straight into it, no matter how scary it may be, and sometimes in public.

Because by doing so, you take the power out of the matter and expose your own weakness so that other men can do the same.

For example, not long ago, I went through a struggle in my life and knew that I needed to talk to my male friends. But I was paralyzed by the fear that my friends would judge me, think I was weak, and that I would lose my position as a leader.

At the end of the third day, I finally mustered up the courage to tell everyone about my struggles.

Amazing things happened when I took action

I wasn't alone. My male friends were suffering as well.

As soon as I had the strength and courage to expose my shame, it disappeared.

What I've learned over time is that if you want to practice weakness, you have to build systems you can trust.

I was really blessed as an actor.

I'm surrounded by amazing fans who are really, really, really kind and want to get involved, so I decided to use my social network as a Trojan horse, a place where I practice expressing my true feelings and my vulnerability every day.

and there was a great response

The positive response warmed my heart

I get a lot of love, messages and media attention every day.

But only from a certain segment of the population, yes women.

(Laughter) This is reality.

Why are only women following me?

Where are the men?

(Laughter) About a year ago, I posted this photo.

Later, when I was looking through the comments section, I noticed that one of my female fans had tagged her boyfriend, and the boyfriend replied, "Can you please stop tagging gay shit?

thx"

(laughs) Because being gay isn't manly, is it?

I took a deep breath and replied

I replied, I politely said I was interested, because I'm thinking about masculinity, so why is my love for my wife called "gay crap."

I honestly wanted to learn from him.

(Laughter) He replied right away.

I thought he was going to throw his anger at me, but he apologized.

He told me that growing up, showing affection in public was frowned upon.

He told me that he was struggling with his ego and that he loved his girlfriend and appreciated her patience.

A few weeks later, I got a message from him.

Now they sent me a picture of me kneeling down to propose.

(Applause) All he said was, "Thank you."

i was like him

I can understand

He was just playing his part in public rejection of femininity.

But he secretly waited for an opportunity to express himself, to be seen and heard. What he needed was a safe space for other men to take him in. The transformation was immediate.

This experience was inspiring, because it showed that it was possible to transform just by exchanging messages.

I've been looking for ways to reach more men, but no one is following me.

(Laughter) So we did an experiment.

I started posting about typical manly things. (Laughter) Hard workouts, food plans, recovering from injuries.

what do you think happened?

I got a message from a man

And then suddenly, for the first time in my career, a men's fitness magazine contacted me and said they wanted to recognize me as someone who made a difference.

(Laughter) Was it really transformational?

Is it just framed?

that's the problem

When I talk about masculine things and follow gender norms, men want to follow me.

But when you talk about how much you love your wife or your daughter or your 10-day-old son, when you talk about how difficult but beautiful marriage is, when you struggle with body dysmorphic disorder as a man, when you advocate for gender equality, only women are interested.

where are the men

Look, men, men, men!

(Applause) I understand.

men grow up challenging each other

I have to be as stubborn, strong and brave a man as I can.

For many men, myself included, our identity ultimately comes down to how we feel masculine enough.

But let me give you guys a challenge, because men love challenges.

(Laughter) Can you use the qualities that keep you manly to go deep inside yourself?

Your strength, your courage, your tenacity, can we redefine what it means and use it to search our hearts?

Are you brave enough to admit your weakness?

Can you ask other men for help?

Can you dive straight into shame?

Are you strong enough to be sensitive? Can you cry when you are hurt or happy? even if it looks weak

Are you confident enough to listen to the women around you?

listen to their ideas and solutions

Can you accept my pain and trust me with all my heart? even if you disagree with me

And can you be manly enough to stand up to other men when you hear "male dirty talk"? When you hear stories of sexual harassment

If a guy friend grabs a woman by the butt or gets her drunk, can you stand up and do something about it? I hope someday this world will be a place where women don't have to take risks and say "me too"

(Applause) This is an important issue.

I had to honestly reassess how I was unwittingly hurting women, and it was terrible.

My wife told me that I did something that hurt her and didn't stop.

He says that sometimes when his wife tries to talk, whether at home or in public, he interrupts her and continues the sentence.

it must be terrible

Worst of all, I was doing it without knowing it.

It was an unconscious act.

So while I'm trying to be a feminist here, trying to amplify the voices of women around the world, in fact, at home, I've drowned out the voices of the women I love most.

I had to ask myself hard questions: Am I manly enough - enough to shut up and listen?

(Laughter) (Applause) To be honest, I didn't want the applause.

(Laughter) Men, this is a real issue.

This is just the tip of the iceberg, and the deeper you dig, the more terrible things are surely hidden.

I don't have time, so I can't talk about pornography, violence against women, division of household chores, or the gender pay gap.

But it's time for us as men to not let our privileges fool us and understand that we're not just part of the problem.

we men are the problem

We have a glass ceiling because men built it.

I would like to quote a favorite quote from the Baha'i Faith.

"There are two wings in the human world, male and female.

Unless these wings are equally strong, the bird cannot fly."

So ladies and gentlemen, on behalf of all the men in the world who feel the same way as I do, please forgive the men who haven't counted on your strength.

And I want you to help us men, because men alone can't do it.

I'm a man, so I'm sure I'll fail

You can say the wrong thing and go crazy

It's probably going to piss you off.

But don't give up hope

Women are men, and when women face everything, men must stand up and stand with them.

Men need women's help to accept their weaknesses, and please be patient as men make the long, long journey from head to toe.

Finally, parents of children, instead of teaching your children to be brave boys and pretty girls, can't we just teach them to be good people?

let's get back to my father

Like any other boy, he had some problems growing up, but I now know that it was his sensitivity and his emotional richness that enabled him to speak here.

The anger I felt towards my father had nothing to do with him.

It was a desire to be approved entirely for my own problems, a desire to play roles that didn't fit me.

Instead of teaching me how to use my hands, my father taught me how to use my mind, and that's what makes me a man more than anything else.

thank you

(applause)

Trees are full of great places to discover their tall, intricate structures, their tranquil beauty and biodiversity.

I've always loved climbing trees, and now, as an adult, I have a career in understanding trees and forests through science.

The most mysterious part of the forest is the leafy canopy.